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Contractors and Engineers Monthly

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AUG 20 1951

Vol. 48, No. 8 AUGUST, 1951 $4 a Year, 50 Cents a Copy

Covering the Field

• Prestressed Concrete
Its principles, merits and demerits, and basic methods are reviewed beginning on page 3. Pictures too.

• Building Construction
Concrete floors, foundations, and walls of the huge hotel-office Statler Center are built using lightweight aggregate (page 5). Controls have to be precise.

Patients were spared the sound of riveting while their hospital got some additions; steel frameworks were welded, to cut noise and costs. See page 46.

• Bridge Repaired Fast
A truck wrecked a bridge span just as the tourist traffic was due to begin. Engineers dismantled another bridge to get an emergency span, and 60 days later opened the bridge to traffic. Page 12 carries this fast-moving story.

• Wharf on Piles
It consists of an RC beam-and-slab deck on 2,800 precast-concrete piles. Concrete was pumped to the casting yard and the deck from a central mixing plant. Page 17 describes the $1,901,369 project.

• Airfield
The parking and dock maintenance aprons which Mex-Tex Constructors paved at Walker Air Force Base—see page 24—are designed for 100,000-pound wheel loads! The compaction assignment was unusually tough to carry out.

• WASHO Meeting
Major action taken: a resolution to construct a bituminous test road to give loading data for asphalt pavements. Page 29.

• Freeway Bridge
In the Los Angeles master plan of freeways there are many bridges. The story on page 36 tells how a major one that posed complicated forming problems was built across a flood-control channel.

• Bituminous Paving
Waterbound-macadam base, then a binder and a top course of hot-mix, each about 1½ inches thick—the story, page 40.

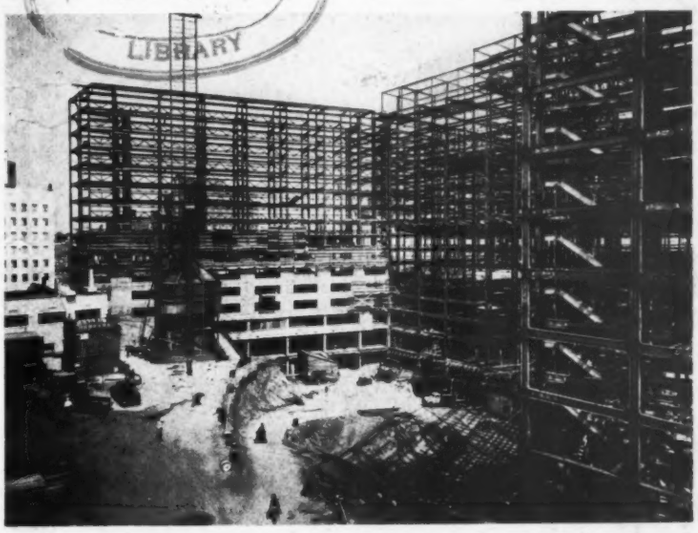
• County Road Work
This job through Arizona mountains would normally have been done by contract, but enough county men and machines were available, and speed was no object. Page 51 reports the 15 miles of grading.

• Fireball Concrete Paving
In fact, an average of 1,000 cubic yards a day, one shift, on the 5 miles of dual highway. The subgrade was cement-treated. Pictures and story on page 66.

• New York City Tunnel
This one takes some crosstown traffic off the streets and speeds it to and from bridges and expressways. Underpinning was a big preliminary. Page 73.

• Grading Cross-State Road
The 8½-mile contract (see page 82) will be a link in a badly needed alternate to a congested route across Mississippi along the Gulf Coast.

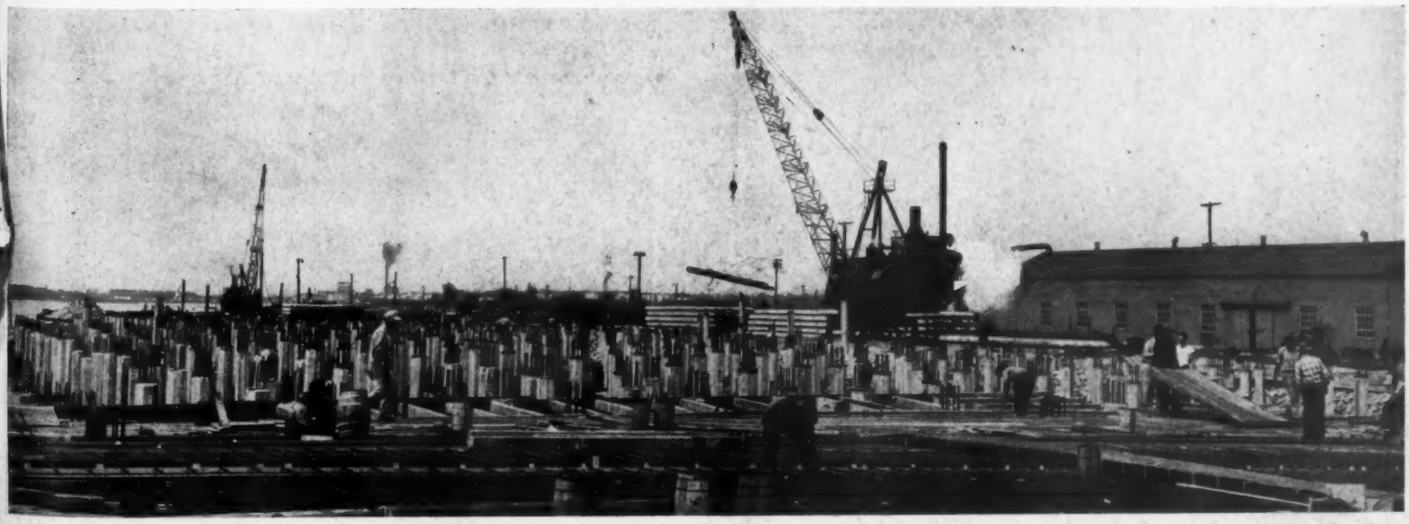
(You will find "In This Issue" on page 4)



Contractor Robert E. McKee is using Rocklite concrete for the outer shell, inner floors, beams, and structural fireproofing of Statler Center, the new $22,000,000 hotel-office building in Los Angeles. Page 5.

C. & E. M. Photos

Two Caterpillar dual tamping rollers—one pulled by a Minneapolis-Moline tractor and one by an International TD-19—compact fill on Mississippi State Route 26. Pigford Brothers Construction Co. is doing the 8½-mile job described on page 82.



A dock in the making at Wilmington, N. C.—Diamond Construction Co. the contractor (see page 17). Beyond a paved deck section, workmen set reinforcing steel. Beyond them are some of the 2,500 precast-concrete piles for the dock and a Diamond-built gantry moving timber piles.

NEWS AND VIEWS

of the construction industry — more controls, their administration, reaction of industry

We spoke last month of the howls that greeted NPA's Order M-4. Well, they've subsided a bit now. Highway people especially have been less vocal ever since it became clear that the **BPR and not the Department of Commerce will administer Order M-4,** do the actual authorizing of road projects. The delegation of authority promises a more sympathetic ear for road problems and more speed in processing applications.

The BPR's authority covers all highway construction, maintenance, and operation—including traffic control. (Authority over new construction for public carriers operating on the highways, and for railway, inland waterway, and port facilities has been delegated to the Defense Transportation Administration.) State highway departments wishing to commence road construction will apply to the BPR district engineer in the state. But **county departments will channel their applications through their state highway departments.** A similar plan will be followed in distributing construction equipment and materials under the emergency program, so cities and counties should keep their state highway department informed about their needs.

Incidentally, the **road steel which NPA has allocated to the BPR** for July, August, and September—and which BPR will allocate to the states—totals 300,000 tons. If the figure stays constant, it will mean 1,200,000 tons a year, or about 300,000 tons short of estimated highway needs.

Home builders, too, are a little happier. First, Congress has somewhat relaxed credit controls under Regulation X for veteran home buyers. Second, Defense Mobilizer Wilson has announced that **next year's housing program will be 800,000 units.** Any Washington news that is definite is good news these days, and the home builders are relieved to know at least where they stand. They are neither happy nor unhappy about Regulation 6 under the Controlled Materials Plan—they're just surprised. For **unlike other regulations, No. 6 is permissive instead of mandatory.** It makes available to the average home builder a permit and material-allocation system, but does not require him to use it—yet. The question meanwhile is whether builders will be able to obtain steel, copper, and aluminum without a specific allocation for each job. A report compiled recently by the National Association of Home Builders and the Producers Council Committee shows the **supply of almost all building materials adequate for a volume of 850,000 housing units this year.** But if CMP, when it finally gets into full swing the last quarter of the year, causes a scare and widespread buying and hoarding, builders may find themselves crying out for allocations.

Massachusetts Department of Public Works Photo

Late this fall, traffic to and from Boston, Mass., will be using this underpass of the Sullivan Square Project. Concrete poured around and over these forms will support approaches to an overpass. A surface traffic circle at a point left of this picture will afford routes to Cambridge from Charlestown and Everett. The entire project will be completed in June of 1952.

Building contractors of New York State are not at all happy. They feel that **controls will strangle building construction in New York City and other nondefense metropolitan areas;** that the only recourse, if they are to present their case forcefully to government agencies, is a **builders' united national front.** Accordingly, at their mid-year meeting, the Building Industry Employers of New York State unanimously adopted a resolution calling for the formation of a national association of local builders' exchanges and state associations of builders "to protect the building construction industry from adverse governmental regulations". William E. O'Brien, Director of the NPA Division of Industrial Expansion, told the contractors that the **next six months would be the worst.** After that, he said, the steel industry will have about completed its expansion program, more steel will be available, and some controls may be done away with.

At this writing, **peace talks are under way in Korea** and people are waiting, hopeful yet cautious, for the outcome. Yet whether or not there is a settlement, it seems certain that the U. S. will continue to arm itself and its allies; mobilization will continue to crowd the domestic economy; and controls will be with us yet awhile.

Algiers Lock in Orleans Parish, La., reached the backfilling stage early this year, and Caterpillar tractor-dozers and motor graders of C. W. Vollmer & Co., Houston, went to work. (See C&E Monthly, October, 1948, for an account of pile driving, and February, 1950, for concreting.)

Prestressed Concrete: Its Future in the U. S.

Principles Behind It; Merits And Demerits; Basic Methods And Their Variations; Some Typical Applications

By MICHAEL A. SPRONCK,
Associate Editor

• IT is hard to determine objectively the future of prestressed concrete in American construction. We read of engineering marvels accomplished with it in Europe, but there is great reluctance to use it in this country. This reluctance is defended on the ground that although prestressed concrete may save material, it takes a lot of labor, and labor costs are higher here than in Europe. Even if this is true, it need not remain so. American ingenuity in adapting a *foreign* development to assembly-line production, to mechanization in the field, and to cost and time-saving techniques can continue to balance our higher wage standard. (The word foreign is used with reservations since, contrary to popular belief, many of the earliest patents covering prestressing were filed by American inventors.)

Let us start then with the basic premise that there is much of interest in prestressed-concrete construction, and that by accepting it as a challenge to the skill of our engineers and contractors, we can open new fields of achievement. Before reviewing the very simple principle upon which it is based and how it is applied to various methods of design and construction, let us see what has made prestressed concrete one of the most-talked-of subjects.

Merits of Prestressed Concrete

Though not without disadvantages, prestressed concrete has many merits. It is virtually a new material, as much unlike standard reinforced concrete as it is unlike structural steel, though it has qualities of both. Prestressed concrete can be made crackless under design loads and will close cracks developed under excessive loads after these loads are removed. Designed for structures which can also be built of reinforced concrete, it requires as little as two-thirds the amount of concrete and one-fifth the amount of steel, though both must be of a high quality. This decrease in dead weight reduces the requirements for the substructure and foundations. The greater allowable span-to-depth ratio and smaller deflections under load adapt it to highway and railroad overpasses and to airport-hangar construction where clearance is an important factor. The prestressed-concrete structure is a reliable structure, proof-tested during normal construction to stresses greater than those encountered under maximum working loads. Prestressed concrete is a universal material which may be produced completely in the field or manufactured in a plant, or may even combine the best features of both methods of production. Its special properties also adapt it to uses where other methods would not serve as well—underpinning and wall strengthening, for example.

Though certainly not economic for every job, there are few structures for which it is not suited. It has been used for beams and girders in building and bridge construction; for railway sleepers; power-line masts; silos, tanks, reservoirs, and pipes; barges; piles; retaining walls; floor slabs; roof domes; airport-runway and road slabs; underpinnings; and other special purposes.

Shortcomings of RC

The basic concept of prestressing is simple. It is easy to understand and is witnessed by many of us every day. Our forefathers practiced it when they sweated a steel rim on a wagon wheel. We see it when a bricklayer carries a load on his tongs or when a dozen books are lifted from a library shelf. Compressed at the ends, the "beam" of books may be lifted as a unit—even supporting other books on top—despite the apparent weakness of such an affair. Prestressing is a method of overcoming the inherent weakness of certain materials in tension. Applied by even prehistoric man in fashioning his bows, there is nothing new about it. It is unique only in its refinements and modern applications. The amazing fact is that we have taken so long to realize its potentialities.

Concrete is a good sound structural material. It will withstand loads of 5,000, even 10,000, pounds per square inch in direct compression. But under tensile or pulling forces it will rupture after a few hundred pounds have been applied. A "cure" for this is reinforced concrete, where steel rods are used within the concrete to resist tensile forces encountered in structural use. Reinforced concrete serves many pur-

(*Continued on page 84*)

Adapting yesterday's highways to today's traffic at minimum cost

One of America's most serious handicaps is the large and steadily growing mileage of its highways which are inadequate for today's traffic. The country and its road builders are confronted with the need for a large-scale highway modernization program on the one hand, and limited funds with which to perform this vitally important job on the other.

In this situation, it is imperative that available highway dollars be expended so as to deliver the maximum road mileage capable of coping with today's traffic.

The State of Texas recently demonstrated how this can be done in a project involving the improvement of 20 miles of heavily traveled U. S. 90 between Houston and Beaumont. The State Highway Department widened the existing 20-foot-wide concrete pavement to 24½ feet, using hot-mix, hot-laid Texaco Asphaltic Concrete, laid in four courses to a compacted thickness of 10 inches. Over the full width of widened highway, 3½ inches of resilient, heavy-duty Texaco Asphaltic Concrete was then laid in three courses.

By this method, which effects a substantial saving over entirely new construction, Texas has successfully speeded the flow of traffic on U. S. 90, with greatly increased safety and riding comfort.

Two helpful booklets describing all types of Asphalt construction can be obtained by writing our nearest office.

PHOTOGRAPHS show method of laying and compacting 4½-foot-wide Texaco Asphaltic Concrete addition to old pavement, laid in four courses totaling 10 inches thick. Other photos show the 3½-inch Texaco Asphaltic Concrete wearing surface under construction. Bottom photo shows completed project, except for shoulders and striping. Traffic averages 5,700 vehicles a day, 31 percent of them commercial.

Contractor: Gulf Bitulithic Company of Houston, Texas.

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Big Step Toward Highway Economy

An important and significant step to guard highway funds and reduce future land-acquisition costs has been taken in Maryland. A new law, effective June 1, gives to the State Roads Commission the power to condemn property not only for immediate use (like other state highway departments, it already possessed that power) but for its future needs as well. (See page 57 of this issue.)

As a result, the Commission can now, by condemnation, acquire property which it knows it will need for future highway development, and thus prevent commercial or residential building or expansion which would greatly increase the value of the property. The savings thus to be made in land acquisition are immeasurable, but certainly will insure large sums for highway work which otherwise would go for the ever-rising cost of right-of-way purchase.

With highway plans and programs now so far ahead of available funds and materials, it would be every highway department's prerogative to protect property needed in the future. Yet many departments must stand by, powerless, and watch land values soar through development of an area which eventually will be needed for highways.

A few states have already taken some preventive measures. California has a law whereby building construction may be controlled on planned locations of state highways in unincorporated areas. This is done by denying permits to build anything but temporary structures in such right-of-way areas.

Ohio, too, has a technique for preventing development of areas it expects to need for its highways. This is a highway reservation agreement whereby, for a nominal sum, the state "reserves" the land and the owner agrees not to build or allow to be built any structure which cannot be moved within 10 days at no cost to the state; he further agrees to make no permanent plantings (such as orchards) or otherwise interfere with the ultimate use of the land for highway purposes. Under this system, the Director of Highways may cancel the agreement should the highway plans be changed.

Maryland's new law is more positive and permanent. True, it has the possible disadvantage of tying up highway funds in property, but presumably the state could receive some income from the land until it is needed, and has definite protection against exorbitant prices when the time comes to build the highway.

Other states would do well to emulate Maryland's foresighted action. Here is an opportunity for good roads associations and other organizations interested in the highway program to cooperate actively and constructively with their highway departments by promoting such legislation. It can save many millions of dollars for much-needed highway construction.

Is This Happening on Your Job?

Careful observers have long noted that highway subgrade failures often occur at the transition points where fills blend into cut sections. Many and varied explanations have been offered for this phenomenon. All seem to have some weight.

But the simplest explanation of all, and the one for which there is no logical excuse, is that these points are neglected too often by compaction equipment. Roller operators, when working on the fill, don't go up into the mouth of the cut to turn around. Rolling cuts, they fail to go to the start of fill to make their turn. Thus what should be an overlap of compactive effort at a point of vulnerability turns out to be little or no compaction at all.

Astute resident engineers in some of our better highway departments know this, and govern their compaction accordingly. But we have found, from prolonged observation in the field, that many a resident engineer doesn't know. We have seen enough neglect at these vital points recently to be alarmed.

Certainly you can't leave uncompacted gaps at the most vital points in a project and expect that job to hold up under modern traffic for many years. And yet that very thing is happening much too often.

Is it happening on your job?

Fourteen Points for Leadership

It has been said that leadership can't be defined; that a person either has or has not the qualities which make him able to manage men. People point to a great construction-company manager and say, "There's an example of leadership."

Well, mebbeso. But if that man is a leader and a manager, we'll venture to say that an analysis of his secret would disclose the following fourteen points, which we without regret stole from a bulletin board in the Tacna, Arizona, office of Western Contracting Corp.:

1. Avoid hasty decisions or actions when angry or under emotional stress.
2. Base decisions on merit alone. Apply rules uniformly.
3. Keep the promises you make. Avoid making any you can't keep.
4. Acknowledge your own mistakes and refrain from buck-passing.
5. Avoid decisions or actions before all the facts are in and carefully considered.
6. Avoid delaying decisions and actions after all facts are carefully weighed.
7. Explain reasons back of your decisions and actions.
8. Be reasonable in your requests of others.
9. Be friendly, patient, encouraging. Give compliments when they are deserved.
10. Be diligent and efficient. Do your job as well as you expect others to do theirs.
11. Get acquainted with your men. Get their point of view.
12. Invite and welcome suggestions. Be courteous and interested.
13. Where differences of opinion exist, be calm, pleasant, and open-minded.
14. If in doubt, ask a neutral person to appraise your judgment.

It seems to us that these points represent an excellent working manual for fairness and leadership for all foremen, inspectors, superintendents, engineers, and anyone else who aspires to leadership and advancement in human relations.

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BPR to Issue Permits For Road Construction

The National Production Authority has given the Bureau of Public Roads the authority to issue permits for highway construction. In Delegation 14 (Construction) it authorized the BPR to receive, consider, pass on, and take action—including appellate action—upon applications for a permit to commence construction pursuant to NPA Order M-4 and upon applications for adjustment or acceptance which are based upon a claim of unreasonable hardship, or upon a claim that prohibition of construction is not in the interests of national defense.

The BPR's authority covers programs for highway construction and maintenance of all rural and urban highways, streets, highway equipment repair shops, bridges, tunnels, toll road facilities, and appurtenant installations, regardless of financing.

According to the Delegation any authorizations, adjustments, or exceptions issued by the BPR must be correlated with its activities under NPA's Controlled Materials Plan. The allotment of all controlled materials made under Delegation 14 will be charged against the total construction program and allotments approved for each delegated agency by the Defense Production Administration.

Can Highways Hypnotize?

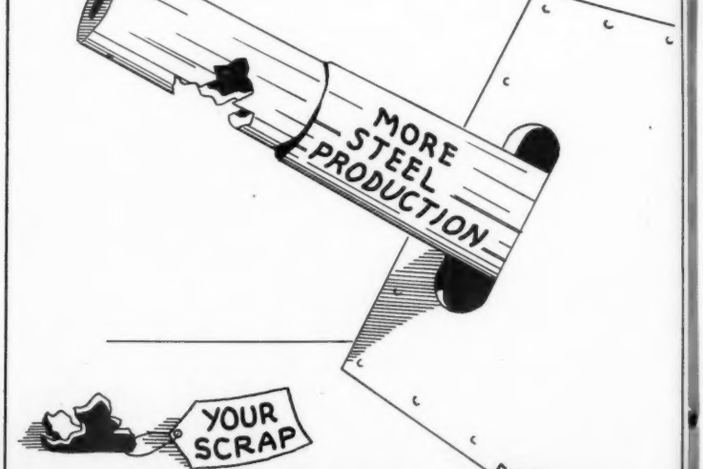
This question may soon be studied by medical men and psychologists with the Pennsylvania Turnpike as the testing ground and truck drivers as guinea pigs, says the American Automobile Association.

When a vehicle leaves the highway or crashes into another vehicle without leaving skid marks, it is generally assumed that the driver has dozed off. The extraordinary number of accidents caused by drivers dozing off on some sections of modern highways has made engineers suspect that a uniformly straight road may exert a Svengali-like influence.

Many motorists experience a sleepy feeling after driving long distances on straight highways. The fixation of attention as well as the lulling sound of the motor going at a steady pace and the tires whirring on the pavement are akin to methods inducing hypnosis.

In designing some of the newest highways—among them the Route 4 Parkway in New Jersey—this factor was considered. Contour grading was used to provide relief from the monotony of a cross section with long tangents and a straight clearing line along the sides of the travel way.

A VITAL PIECE IS MISSING



Statler Center Uses Rocklite Concrete

Lightweight Aggregates Reduce Weight of Outer Concrete But Structural Strength Is Maintained

By RAYMOND P. DAY,
Western Editor

(Photo on page 1)

• SOMETIME soon, Los Angeles sidewalk superintendents are going to be surprised. For what they took to be plain gray concrete will change quickly to pleasing, light-hued blocks resembling cut stone. The more observant laymen in the constant crowd around Statler Center are likely to rub their eyes in amazement.

For Rocklite concrete, a special material weighing but 100 pounds to the cubic foot, is being used by Contractor Robert E. McKee to make the building's outer shell, its inner floors, beams, and structual fireproofing. Exterior scoring of concrete, to duplicate the building-block appearance on the new $22,000,000 hotel-office center, is being formed by wood strips nailed to the concrete forms.

The lightweight concrete requires less form bracing; structural tests have gone as high as 4,200 pounds in 28 days; and the Rocklite aggregates have the apparent ability to reduce the water-cement ratio through absorption. On the other side of the ledger come certain tricky characteristics which make somewhat more precise control necessary, as compared to standard concrete. The larger particles of lightweight concrete have a tendency to float, it is difficult to measure the slump, the material has a tendency to pile up where it is dumped, it is tricky to finish and vibrate. But these problems have been solved at Statler Center, and both officials and workmen like the lightweight material which was so new to them.

"I believe you're going to see a lot of it from now on", said the General Job Superintendent J. L. Morris.

Material Widely Used

The height-limit 14,000,000-cubic-foot Statler Center building covers a 3-acre plot at Wilshire Boulevard and Figueroa Street in downtown Los Angeles, and it makes extensive use of lightweight concrete. From foundations to roof the material is widely used. The heavy structural-steel building frame is being fireproofed by enclosing the steel members in concrete. Floors, foundations, and walls are being made of lightweight concrete.

At the second floor above street level the floors become typical, and both the concrete ceilings and floors will be permanently exposed. The ceilings will be painted, and the floors will be covered with rugs, so concrete as such will not be recognizable to Statler guests.

Below the second floor, the material was used in varied ways. On the fan-room floor it got a dense steel-troweled finish, and this turned out to be a problem. On some of the other low floors the concrete is to be covered with terrazzo, asphalt tile, and other such materials, and finishing these spots was easier.

Three main mixes are in use. The first mix is a 3,000-pound structural concrete for foundations below grade and slabs on fills. It contains no lightweight aggregate and none of the Tricosal admixture used in the lightweight mixes, and is proportioned as follows:

Cement	588 pounds
Structural sand	1,378 pounds
Rock, 1-inch	1,833 pounds
Water	300 pounds
Mixing time	1½ minutes
Yield	1 cubic yard

The main lightweight-concrete batch, which is used for all slabs and walls, is a 2,500-pound 6-sack mix which uses enough air-entraining agent to develop about 4 per cent entrained air. Other components are:

Cement	564 pounds
Structural sand	697 pounds
Rocklite sand	440 pounds
Rocklite ⅜-inch rock	443 pounds
Rocklite 1-inch rock	345 pounds
Water	310 pounds
Mixing time	2 minutes
Yield	1 cubic yard

A special lightweight fireproofing mix

(Continued on next page)

C. & E. M. Photo

Concrete Superintendent Moody (third from left) lost a bet on concrete yield; he's paying off to Concrete Technician Ramsey. Witnesses are (left to right) Batch Plant Operators Sartories and Rantneister, Los Angeles Testing Lab Engineer Strohecker, and General Superintendent Morris.

SURE-GRIP
Tops for drive-wheel traction
HARD ROCK LUG
Super-tough champ for all types of rock work
HARD ROCK RIB
Companion tire for front wheels in rock work
GOODYEAR

It must pay to Buy and Specify

GOODYEAR

BECAUSE MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND!

Sure-Grip—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Statler Center Uses Rocklite Concrete

(Continued from preceding page)

is also being used, especially around the structural members. The 2,500-pound-test mix is made up as follows:

Cement	564 pounds
Structural sand	319 pounds
Rocklite sand	759 pounds
Rocklite ¾ inch rock	800 pounds
Water	350 pounds
Mixing time	2 minutes

Job Organization

General Job Superintendent J. L. Morris has organized the concreting for utmost efficiency. The way he has it arranged, the maximum amount of competition is generated between crews. Scheduled concrete pours are posted a week ahead of time, and the inter-crew competition often makes it necessary to revise schedules ahead.

Since the concrete plant is set up adjacent to the west wing of the building, pouring schedules naturally centered first on that portion. The work is so organized that fireproofing of steel members stays one or two floors ahead of the concrete crew on slabs. Slab and wall concrete is poured in such a way that the concrete buggies always have a cured-out concrete floor to travel over to the active pours.

The batch plant is a 500-cubic-yard Johnson, with cement and water weighing automatic. Aggregate weighing is manual. By storing a small amount of Rocklite aggregates on the ground at the site, the plant can carry enough material to pour for 2 days. But the speed of concreting, which usually hits about 1,300 cubic yards per 5-day week, keeps cement trucks hauling day and night from Riverside plants near Colton, and five large transports with trailers haul around the clock from Ventura, Calif., where the Rocklite aggregate is manufactured. This material, incidentally, is baked at high heat. The particles have a tough, dense outer coating over a somewhat porous interior.

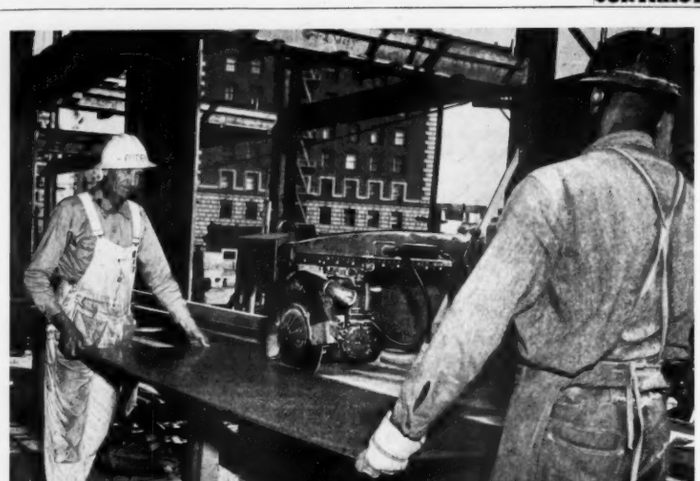
Forming

Glazed-plywood form facing, nailed to 2 x 4 studs on 12-inch centers, is being used throughout to form all exterior concrete. On some of the interior floor slabs, steel forms are being used, but as these forms become harder and harder to buy they are being replaced with plywood panels.

The exterior panels are made to be used over and over again. Generally they measure slightly over the contact surface dimensions of 8 feet wide x 10 feet high. As the forms are filled and stripped, they are raised to the next level.

Four carpenter gangs have the tremendous forming job. They use lumber and plywood delivered to the site, and usually set up their separate working areas on one of the building floors. DeWalt power saws are used for all major ripping and dimension work, while smaller or more minor work is done by SkilSaws and hand saws.

Superintendent Morris is also using plenty of Burke patented form ties. Beam soffits are being hung with snap-tie stirrups. Burke snap ties hold the form panels together on wall pours.



C. & E. M. Photo

A DeWalt saw cuts form lumber for Statler Center.

Even the panels are fastened together laterally by steel ties. The deck or floor pours throughout the typical sections measure about 23 feet across. They are supported from the floor below by Acrow steel shores, usually placed in two rows between the beams.

Concrete Handling

Concrete materials are carefully controlled from the time they enter the area until the mixed material comes to rest inside the forms. The big Johnson batch plant was specially purchased to hold as much material as possible, mostly because the job site is in the center of the west's largest city, and the entry of all materials through Los Angeles city traffic is difficult.

On the theory that dry Rocklite aggregate absorbs a great deal of water from the mix and thereby lowers the water-cement ratio and increases strength, batching crews do not wet these aggregates. As trucks bring them in, they are gravity-dumped to a 2-

(Continued on next page)

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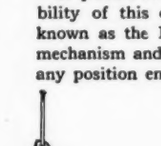
you can't beat this New **FM-3 WAGON DRILL**

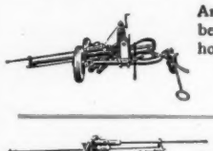
Most construction and mining men are familiar with the famous X-71 WD Rock Drill. Its drilling speed and hole cleaning ability on deep holes are recognized wherever Wagon Drills are used. It is the only drill made especially for Wagon Drill service.

To permit even further utilization of the power and reliability of this drill, we introduce a brand new mounting known as the FM-3. It incorporates a new type of lifting mechanism and a rugged yoke that permits easy drilling in any position encountered in modern rock excavation.

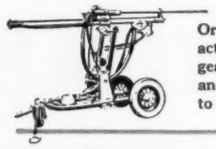


Notice how the swivel wheels are turned and how the drill extends beyond wheels for line hole work against a face.

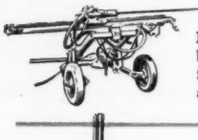
And how low the yoke can be lowered for efficient toe hole drilling.



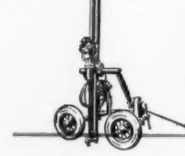
Or how, by a handy crank actuating a powerful worm gear arrangement, the yoke and drill can be easily raised to highest drilling position.



Here's an exceptionally stable and easily moved set up for drilling hole after hole along a face.



What could be more convenient for line hole work? It takes but a minute to swing the swivel mounted wheels through a 90 degree angle.



And for steeper angle drilling, here's another easy set up. All controls are at the operator's fingertips.

Remember Ingersoll-Rand Drills are sold and serviced by men who know rock drilling. Take advantage of this highly trained and skilled service. There is an Ingersoll-Rand branch office and distributor near you. Write or call today.

Ad 5963

Ingersoll-Rand
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AN IDEAL DRILLING TEAM—TWO FM-3 WAGON DRILLS AND THE NEW I-R 600 C. F. M. "GYRO-FLOW" PORTABLE COMPRESSOR

C. & E. M. Photo

C. & E. M. Photo

Whiteman Power Buggies pick up concrete at a downspout on the pouring floor . . . . and here one of them makes a pour.

compartment receiving hopper, and raised by cold elevator to the batch-plant compartments.

Sand, however, is sprayed as it enters the receiving hopper. A permanent pipe and spray heads have been installed for that purpose. The sand is usually so dry and dusty that some form of wetting was indicated from the start. When they actually began to spray the sand, however, concrete crews found the mixed concrete handling easier and running more uniform from batch to batch. The spraying of sand is now standard practice, both for that reason and because of the desirability of keeping down dust.

On a floor below the plant operator are two Koehring 28-S concrete mixers. Batches enter these mixers with very little waste of time, and many days the concrete plant has consistently delivered at its capacity, 60 cubic yards an hour. CONTRACTORS AND ENGINEERS MONTHLY visited the work the day crews were pouring the main ballroom floor—there will be four ballrooms altogether—and a 340-yard pour was over before 3 o'clock in the afternoon.

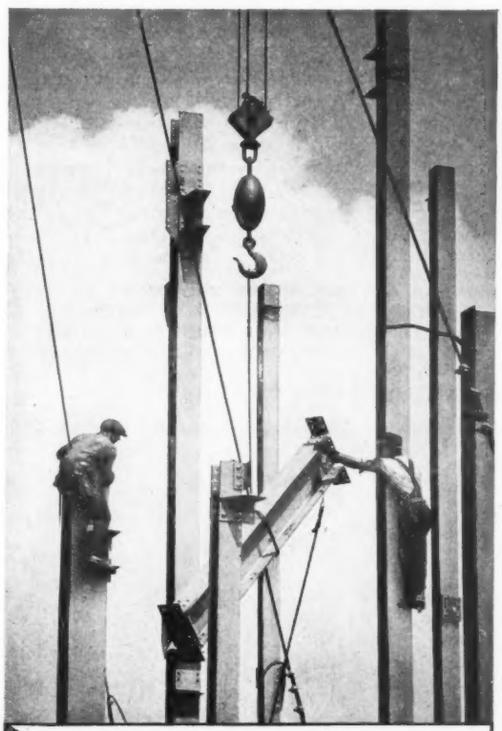
The two concrete mixers receive the dry-batched material along with the cement, water, and Tricosal admixture if required. Mixed material is discharged to a pair of Gar-Bro hoist ing buckets, which are set inside a high tubular-steel hoisting tower. Hoist lines from an electric-driven American 3-drum hoist then raise these loaded buckets up to the pouring floor, where the concrete dumps into Gar-Bro transfer hoppers.

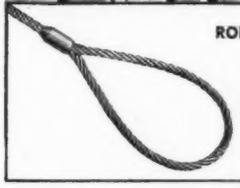
Since many of the hauls will be close to 300 feet long, the contractor is using a fleet of 13 fast, highly maneuverable Whiteman Power Buggies, which will haul ½ yard of concrete at speeds so fast the operators call themselves the "hot-rod boys". The Whiteman Buggies

(Concluded on next page)

FOR MORE ON **LORAINS** TURN THE PAGE

WIRE ROPE





ROEBLING ALL-PURPOSE SLINGS with the Tapered Sleeve Splice come to you ready for the job. They cost less than tucked splices .. have the full strength of the rope. Send for the full story.

On every type of equipment you'll do best with Roebling

"BLUE CENTER" STEEL wire rope is an exclusive Roebling development. It has to pass the most stringent tests for strength, fatigue and abrasion resistance . . . gives rope the extra life that spells economies. Besides, Roebling Preforming assures you top performance on the job. "Blue Center" Preformed is easy to handle . . . has better spooling qualities . . . reduces vibration and whipping.

Roebling makes a complete line of wire rope . . . offers the right grade and construction for every installation. Have your Roebling Field Man help choose the *right* rope for your equipment. Get his advice on the correct use and maintenance of wire rope. It is based on performance records on thousands of installations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

Atlanta, 934 Avon Ave ★ ***Boston,*** 51 Sleeper St ★ ***Chicago,*** 5525 W. Roosevelt Rd ★ ***Cincinnati,*** 3253 Fredonia Ave ★ ***Cleveland,*** 701 St. Clair Ave, N.E. ★ ***Denver,*** 4801 Jackson St ★ ***Detroit,*** 915 Fisher Building ★ ***Houston,*** 6216 Navigation Blvd ★ ***Los Angeles,*** 216 S. Alameda St ★ ***New York,*** 19 Rector St ★ ***Odessa, Texas,*** 1920 E. 2nd St ★ ***Philadelphia,*** 230 Vine St ★ ***San Francisco,*** 1740 17th St ★ ***Seattle,*** 900 1st Ave, S. ★ ***Tulsa,*** 321 N. Cheyenne St ★ Export Sales Office, ***Trenton, N. J.***

Statler Center Uses Rocklite Concrete

(Continued from preceding page)

have dual front wheels, and when quarters are cramped the operators often maneuver the Buggies to position by allowing one of the dual wheels to extend over the platform or runway.

Runways, which are somewhat heavier than would be required for conventional hand buggies, are 4½ feet wide and made of 12-foot panels. The panels rest on 4-legged supports. Support legs are tapered, so they can easily be set in place despite any reinforcing steel. A small crew does nothing but maintain these runways for the Buggies.

Piling of concrete is prevented by careful spotting and dumping of each load. The Buggies often dump against plywood deflectors, which guide the material to the desired spot. It is necessary to dump the concrete as close to final position and grade as possible, because the lightweight material often fails to run like regular concrete.

Any vibration always tends to make the larger particles rise to the surface, so that operation is a critical one. Undervibration of course produces honeycomb. The well trained concrete crews now handle vibration first by placing the concrete as carefully as possible. Then they use Viber electric stingers just long enough to consolidate the mass, though not long enough to allow the particles to rise.

As the pour proceeds, the runway crew removes panels from the placing end and carries them back to the next pour.

Concrete in slabs is cured by paper, while wall concrete is wet-cured by the forms themselves. They remain in place 6 days. When the form panels are then raised to the next level by block and tackle, cement finishers point up the concrete surface while it is still green and wet. Later on, when the wooden strips which form the scoring have dried and shrunk, they are removed and the scoring is pointed up.

Strength tests on the lightweight concrete have been generally excellent. Some of the 2,500-pound concrete has tested 4,200 pounds at 28 days. A few erratic fluctuations which allowed the strength to drop down to 2,500 pounds were believed to be caused by a temporary excess of fines in the dry aggregate.

All in all, the lightweight concrete has handled much better than field personnel expected, and its advantages more than outweighed the basic precautions that were necessary in batching and handling the material.

A New Hotel by 1952

Large signs currently posted along the Statler site promise Los Angelenos a new hotel and office center by 1952. At the present time concrete work is expected to be finished by November, and the installation of plumbing, steam and utilities lines, elevator motors, and electric work is starting. The completion of the Statler Center interior after concrete pouring is done should take only a few months' time.

Statler Center will be one of Los Angeles' most beautiful buildings. It will have 25 acres of floor space, 1,275 hotel rooms, and 6,500,000 cubic feet of shop and office space. Extensive use of lights and color by the architects is expected to make it one of the most beautiful buildings of its kind in the country.

Statler Center was designed for Hotels Statler Co., Inc., by the Chicago firm of Holabird & Root & Burgee, working with Statler's Associate Architect William Tabler. Field supervision for the architect is by A. A. Nickman.

For Robert E. McKee, J. L. Morris is General Job Superintendent, Lamar Wilson is District Manager, C. C. Wright is Project Manager, and R. L. Lee is Assistant Field Superintendent.

This is one of the eight aluminum traffic control arches that regulate the flow of traffic over the Delaware River Bridge between Philadelphia and Camden, N. J. They are believed to be the first aluminum structures of this type.

Arches for Traffic Control Are Aluminum

Eight aluminum arches regulate the flow of traffic over the Delaware River Bridge between Philadelphia, Pa., and Camden, N. J. The 79-foot bridge roadway is divided into eight lanes which can be opened or closed to traffic in either direction. The arches are spaced at intervals of 750 feet along the 1.8-mile span. The 16 red and green signal lights on each arch constantly remind travelers which lanes are open for Jersey-bound traffic and which are open for Philadelphia-bound traffic. Each of the eight arches, which supplement two arches at each end of the bridge, weighs 8,700 pounds and is feet long, 4 feet wide, and 5 feet deep. They were made of Alcoa aluminum by the Pittsburgh-Des Moines Steel Co.

Fram Opens Plant in Ohio

The Fram Corp., Providence 16, R.I. has announced the opening of its new oil-filter and replacement-cartridge plant in Greenville, Ohio. Both the Cel-Pak cartridge and the Filcron cartridge, which filters particles down to one micron, will be produced in Greenville. This community has a strategic location for Fram's midwestern distributors and for the major automotive manufacturing centers in Michigan and Ohio.

Other branch factories of the Fram Corp. are located at Pawtucket, R.I.; Portsmouth, N.H.; Jacksonville, Fla.; Otsego, Mich.; and Independence, Kans.

Speed-Power-Guts—The Thew 25 Lorain

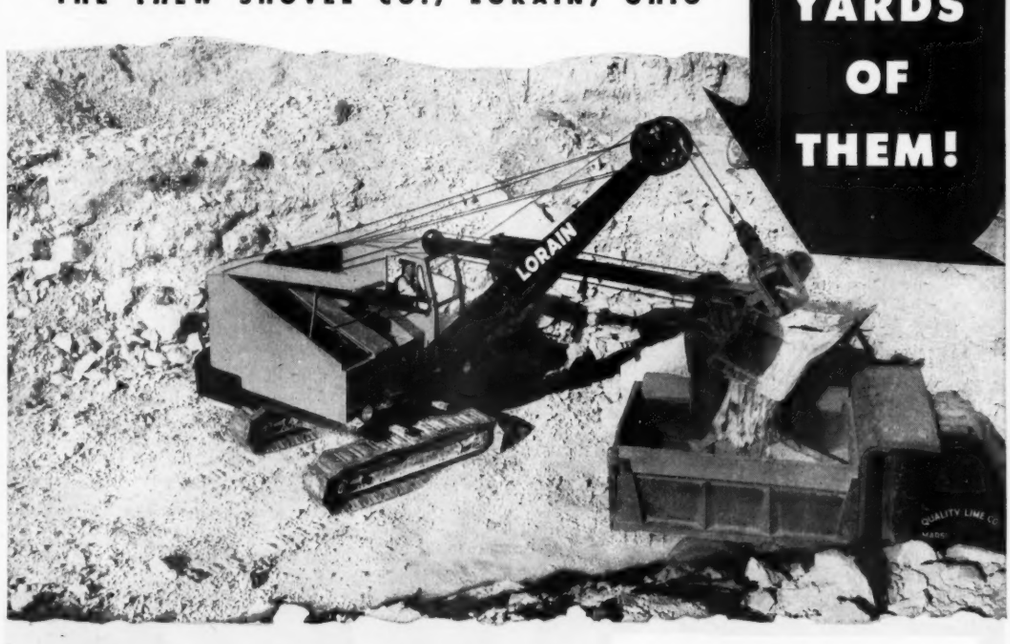
Lorain TL-25 machines have all of these important profit-making qualities . . . *SPEED* — responsive clutches and rapid acceleration save seconds per trip, and more trips per day mean more yardage . . . *POWER* — abundant power from a "plus" engine is delivered by a high-efficiency transmission to just where you want it, when you want it . . . *GUTS* — if you mean ability to take punishment and to hang-on relentlessly until the job is done, "TL-25's" have it . . . or if you mean the "insides" of the machine, "TL-25's" again have it in advanced design and construction that give you these features . . .

• IT'S A COMPLETE PACKAGE—NO EXTRAS TO BUY • INTERCHANGEABLE "PACKAGED" COMPONENTS—FAST, EASY TO SERVICE • 5 IDENTICAL CLUTCHES • ONE-PIECE BED • OIL-ENCLOSED CUT GEARS • INTERCHANGEABLE PARTS • ANTI-FRICTION BEARINGS • HOOK ROLLERS • QUIET, SMOOTH OPERATION • 7 MODELS TO CHOOSE FROM—3 CRAWLERS (STD., EXTRA-LONG OR EXTRA-WIDE) AND 4 RUBBER-TIRE MOUNTINGS

Your nearest Thew-Lorain Distributor can show you these TL-25 features at work!

THE THEW SHOVEL CO., LORAIN, OHIO

HERE'S 3/4 YARDS OF THEM!



THEW LORAIN

SHOVELS • CRANES
HOES • DRAGLINES
CLAMSHELLS
ON CRAWLERS OR RUBBER-TIRES

Huge Dewatering Job For NY Pier Project Fisherman's Paradise

Local legends of sunken treasure in the ½-mile-long lake near Grassy Point, N. Y., have finally been put to an end by a unique construction project that has bared the lake bottom for all to see. The only ones who netted anything while 350,000,0000 gallons of water were being pumped out were game protection crews of the New York State Conservation Department. They netted thousands of fish, the largest one a 28-pound striped bass, and one 20-pound turtle.

Predictions of strange sights in store began to fly early in May after Merritt-Chapman & Scott Corp. and the Corbetta Construction Co. set up field headquarters at Company Pond, a local landmark, and announced it would be drained dry to serve as a "natural dry-dock" for a New York City pier project. The two companies had been awarded a joint $5,685,491 contract for the substructure and deck of a new Pier 57. The unusual pontoon-type structure is being built for New York City's Marine and Aviation Department to replace the one destroyed by fire in 1947.

The contractors' first problem was to decide how and where to build the three huge "boxes" of reinforced concrete that will form the substructure of the pier. Each will be approximately 350 feet long, 150 feet wide at the base, and 34 feet high. Their construction posed no special problem; the big question was how to move them after they were completed.

After searching the entire area around New York, M-C & S and Corbetta found the answer in Company Pond, just south of Grassy Point on the west bank of the Hudson River. Formed over the bed of an abandoned clay pit, it was approximately 2,100 feet long, 650 feet wide, and ranged in depth up to 42 feet. Most important, only a narrow embankment separated it from the Hudson.

In brief, the contractors planned to drain the lake, build the boxes on its bed, reflood the lake, breach the embankment, and then float the three boxes downriver to the pier site, approximately 35 miles away.

Once word got around, their field office on the edge of Company Pond started to receive forecasts by phone and visit of what they could expect to find as the water went down. Among the most interesting predictions were: loot from several unsolved burglaries, missing automobiles, caches of bottled goods from Prohibition days.

Local interest naturally ran high when, on May 7, "Operation Drainage" got under way. Four 10-inch pumps with a combined capacity of 12,000 gallons per minute were floated out to the deepest part of the pond on two pontoon-supported rafts. Barrel floats supported the 250-foot lengths of 10-inch pipe and hose through which the water was sent from the pumps up and across the embankment and into a sluiceway leading to the Hudson. As the water level dropped, the pontoon-supported pumps dropped with it.

Twenty days of round-the-clock pumping brought "Operation Drainage" close to bottom. Fish salvage crews of the State's Conservation Department had been making intermittent trips to the work site throughout the period, but at that point they stepped in with their nets to make a final round-up. As fast as the fish were scooped out, they were sorted into two lots—the game fish for restocking in nearby waters and the scavengers for disposal. Aside from the fish, about the only things of any consequence that came to light were the remains of several old clay carts and of a pumping system that had once seen service for the old Hudson Valley Brick Co., which operated the clay pit until 1928.

All told, the State Conservation crews removed 8 striped bass, 6,147 blue gills, 168 large-mouth bass, 348 white perch, 260 yellow perch, 239 calico bass, 25 carp, 291 bullheads, 30 catfish, 42 eels, and one 20-pound turtle. Striped bass and white perch are salt water fish, but could survive in the brackish water of Company Pond. One theory is that they were washed into the lake and became landlocked during last November's hurricane, when the Hudson flooded into the lake. The tidal point of the river is north of the work site.

With drainage completed, the next step for Merritt-Chapman & Scott and Corbetta is to level a 1,500 x 250-foot strip of the lake bed to a grade approximately 33 feet below the mean water level of the Hudson River. A gravel base will be built on top of the hard-clay graded foundation preparatory to building the pier's three substructure boxes. When they are finally sunk into position, it is estimated that the buoyancy of the boxes will support approximately 90 per cent of the pier's total dead weight.

Douglas-Fir Personnel

Richard W. Pettersen is the Northwestern Field Representative for Douglas Fir Plywood Association of Tacoma, Wash., in Washington, Oregon, Idaho, Montana, Wyoming, Colorado, and Utah. Mr. Pettersen, a former smoke jumper with the U. S. Forest Service, has been on a roving assignment for the Association in the east since last September.

"Let's go with the rivets."

Mechanical soldiers need good shoes, too!

THESE are days of grave concerns . . . of conservation and mobilization for strengthening the nation's defense—for the survival of our national economy—for the continuance of useful highway, airfield, dam-site, reclamation and other construction programs—for the keeping of every home-front machine in condition to stay on the job until its replacement again becomes a normal procedure.

That includes *your* equipment and emphasizes *your* responsibilities. To benefit fully from the productive life that has been built into your "Caterpillar" equipment, you must be alert to its needs as time and hard usage take their toll in wear and depreciation. For instance:

How are your "Caterpillar" track shoes?

Tough as they are, they can't battle rocks, shale, jolts and grinds forever. Growing shortages in the premium steels that go into them may make early replacements difficult—and extra care of track parts something to think about.

CATERPILLAR, PEORIA, ILLINOIS

DO THIS NOW

YOU'RE THE DOCTOR. Check those sprockets, grousers, rollers, idlers, pins, links and bushings. Proper track adjustment minimizes wear. Sprockets may need switching from side to side, and pins and bushings need turning, to provide new wearing surfaces. Shoes serve longer if you have worn grousers built up before excessive wear occurs.

Reread your Operator's Instruction Book. Anticipate your future parts requirements. Take the facts to your "Caterpillar" dealer. His modern facilities and skilled servicemen are at your disposal. He can rebuild many parts to keep your machines on the job. Their added life will repay the reconditioning cost over and over.

CATERPILLAR
REG. U. S. PAT. OFF.
DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

The Shawnee bulldozer blade can be mounted on Ferguson, Ford, and Ford-Ferguson tractors in about 10 minutes.

New Small Bulldozer

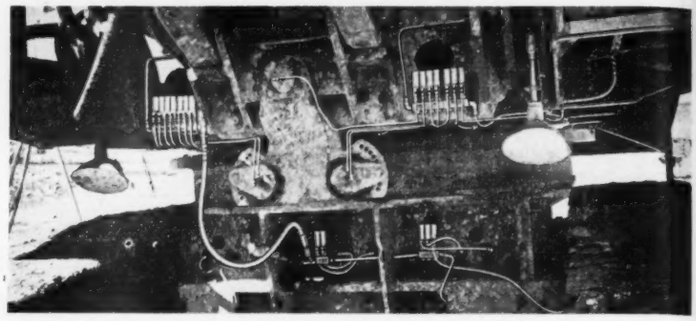
A bulldozer designed for mounting on Ferguson, Ford, or Ford-Ferguson tractors is available from Shawnee Mfg. Co., 1947 N. Topeka St., Topeka, Kans. Equipped with a double-acting hydraulic system, the blade has a width of 5 feet 6 inches and a height of 22 inches. It may be installed in about 10 minutes, the company reports.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 422.

Catalog on Slurry Pumps

A 16-page bulletin on Type R slurry pumps is available from Morris Machine Works, Baldwinsville, N. Y. These Morris units are available with discharge sizes from 2 to 6 inches and are designed to handle all mixtures containing abrasive solids. The pump and its parts are completely described. An exploded photograph shows its construction in detail. Parts list, performance data, and selection charts are included.

This literature may be obtained from the company by requesting Bulletin No. 181, or by using the Request Card at page 16. Circle No. 424.



A Lincoln centralized lubrication system installed on a Marion 5-cubic-yard electric shovel. Note the flexible supply line with detachable coupler, and the injectors connected to the hook roll bearings.

Centralized Lubrication

A bulletin citing the merits of centralized lubrication equipment for shovels, loaders, and other heavy machinery is available from Lincoln Engineering Co., 5701 Natural Bridge Ave., St. Louis 20, Mo. It describes and illustrates the systems, their features, and their applications. (The accompanying photograph shows the Lincoln system installed on a Marion 5-cubic-yard electric shovel.) The bulletin reports that central lube systems cut down the amount of lubricant use, reduce maintenance, and increase production time.

This literature may be obtained from the company by requesting Bulletin 680, or by using the Request Card at page 16. Circle No. 414.

Power Transmission Drives

A complete catalog on Hy-Vo power transmission drives has been released by Morse Chain Co., 7601 Central Ave., Detroit 8, Mich. Catalog C 72-51 discusses the operating principles behind chain drives and describes what the drives can do in the field of high-speed heavy-duty power transmission. The capacities, speed ranges, and service factors of the drives are given, and installation and lubrication procedures are noted.

This literature may be obtained from the company, or by using the Request Card that is bound in at page 16. Circle No. 404.

Lull Appoints Dale McKee

Dale McKee has been appointed Chief Engineer of Lull Mfg. Co., Minneapolis, Minn., designer and builder of construction and materials-handling equipment. Prior to joining Lull, Mr. McKee was Group Engineer at the Bell Aircraft Corp., Buffalo, N. Y., and has specialized in projects involving handling equipment.

GAR-BRO *Power-carts* MOVE MORE CONCRETE at less cost!

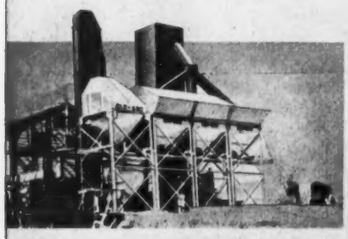
ONE MAN AND A POWER-CART can do as much work per day as 6 to 10 men with wheelbarrows or 3 to 4 men with push carts *because the Power-Cart handles more (up to 14 cu. ft.) and travels faster (up to 12 mi. per hr.).*

On the Power-cart the driver *rides*— uphill, downhill, on 5 ft. runways or over rough ground. He can start fast and stop fast. Has complete control to dump the load or place it carefully. Get the complete facts; write for Bulletin No. 83.

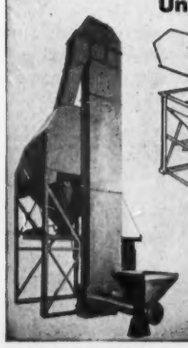
EQUIPMENT GAR-BRO ENGINEERING SERVICE

EVERYTHING FOR FASTER HANDLING OF CONCRETE

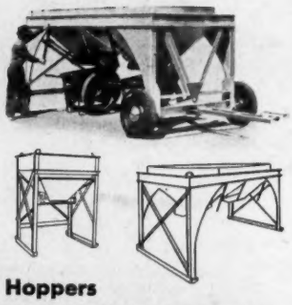
Buckets
World's most complete line—25 models ranging from ½ to 8 cu. yd.



Unit Batch Plants

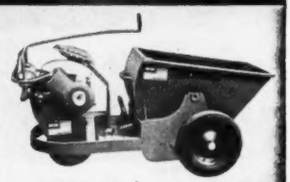


A variable combination of portable aggregate and cement storage bins with traveling weigh hopper.



Hoppers
Includes portable, tower and floor hoppers (28 models) with cap. to 10 cu. yds.

Chutes
A complete line of concrete collection hoppers, steel drop chutes, rubber elephant trunk & line chutes.



Carts
Power-carts with concrete tray, box tray or platform (cap. up to 14 cu. ft.—2000 lbs.). Also six models of hand-push concrete carts.

Barrows
complete line (35 models) with steel or aluminum trays and with wood or steel handles.

Bin Gates and Weigh Hoppers
in all styles and types.

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Atlas

SPEED FORMS Beat High Labor Costs

STEEL Forms—good for reuse again and again without repair—cut material costs far below wood. SPEED forms cut job time — constructors report savings of 1/3 to 1/2 on all types of construction. Glad to give you layouts, cost studies and complete facts. — No obligation. Just send prints of the job to Dept. ME and ask a representative to call.

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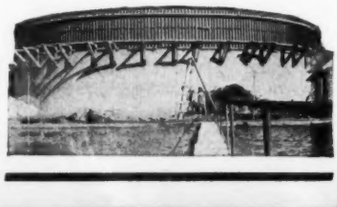
20 Vesey Street • New York, N. Y.



Tractors and Chain Clear Mesquite Land

W. H. Grimes, land-clearing contractor of Stamford, Texas, uses an International TD-24 diesel crawler tractor and a Caterpillar D8 hitched to the ends of a 400-foot 15,000-pound battleship anchor chain to speed his land-clearing operations. The chain links are made of 1½-inch-round stock and weigh 20 pounds apiece. Additional weight is supplied by 500-pound weights attached to the chain at intervals of 35 feet. The big tractors and the weighted chain can knock down and uproot in 150-foot swaths the mesquite, live oaks, chaparral, and prickly-pear cactus bushes which flourish in Texas pastures. Mr. Grimes says he can clear 20 acres in an hour.

W. H. Grimes uses a battleship anchor chain hitched to tractors to clear a 500-acre tract of pasture land on John McCowan's ranch near Stamford, Texas. Mr. Grimes says this method will clear 20 acres an hour.

When he clears land for crop production, Mr. Grimes uses a heavy root plow after knocked-down trees and bushes have been bulldozed into piles and burned. The root plow is a heavy blade 8 feet 8 inches wide, which is worked 18 inches below the surface and is pulled behind the TD-24.

DISTRIBUTORS

ALABAMA—Tractor & Equipment Co., Inc., 4401 First Ave. N., Birmingham 1.

ARIZONA—Lively Equipment Co., Albuquerque, New Mexico.
State Tractor & Equipment Co., 407 S. 17th Ave., Phoenix.

ARKANSAS—Euclid-Memphis Sales, Inc., Memphis 2, Tennessee.

CALIFORNIA—The Euclid Road Machinery Co., Emeryville, 339 W. Maple St., Monrovia.

COLORADO—Constructors Equipment Co., 3707 Downing St., Denver 5.

CONNECTICUT—The W. I. Clark Co., 2195 Dixwell Ave., New Haven.

DELAWARE—L. B. Smith, Inc., Camp Hill, Penna.

FLORIDA—Florida-Georgia Tractor Co., 2806 W. Beaver St., Jacksonville; 2415 State Rd., Lakeland; 3139 No. Miami Ave., Miami; 1400 S. Orange Blossom Trail, Orlando; New Quincy Highway, Tallahassee; 216 S. 12th St., Tampa.

GEORGIA—Tri-State, Inc., 880 Glenwood Ave. S.E., Atlanta 1; East Side Highway, Macon.
Tri-State Tractor Co., 712-14 No. Washington St., Albany.

IDAHO—Intermountain Equipment Co., Broadway at Myrtle St., Boise; 210 No. 4th St., Pocatello.

ILLINOIS—Euclid-Chicago Co., 6027 Northwest Highway, Chicago 31.
Euclid Sales & Service, Inc., St. Louis 10, Mo.

INDIANA—Euclid-Chicago Co., Chicago 31, Illinois.
Reid-Holcomb Co., 1815 Kentucky Ave., Indianapolis 21.

IOWA—The Euclid Road Machinery Co., Hibbing, Minnesota.
Fehrs Tractor & Equipment Co., Omaha 2, Neb.

KANSAS—The G. W. Van Keppel Co., Kansas City 8, Missouri.

KENTUCKY—Euclid-Kentucky, Inc., 3900 Crittenden Drive, Louisville.

LOUISIANA—Euclid-Memphis Sales, Inc., Memphis 2, Tennessee.

MAINE—N. A. Burkitt, Inc., Route 1, R.F.D. 2, South Portland.

MARYLAND—Rish Equipment Co., Clarksburg, W. Va.
L. B. Smith, Inc., Camp Hill, Penna.

MASSACHUSETTS—Clark-Wilcox Co., 118 Western Ave., Boston 34.
The W. I. Clark Co., New Haven, Connecticut.

MICHIGAN—W. H. Anderson Co., Inc., 47 West Seven Mile Rd., Detroit 3.
The Euclid Road Machinery Co., Hibbing, Minn.

MINNESOTA—The Euclid Road Machinery Co., Highway 169 West, Hibbing.

MISSISSIPPI—Euclid-Memphis Sales, Inc., Memphis 2, Tennessee.

MISSOURI—Euclid Sales & Service, Inc., 5231 Manchester Ave., St. Louis 10.
The G. W. Van Keppel Co., 2440 Pennway, Kansas City 8.

MONTANA—Hall-Perry Machinery Co., P. O. Box 1367, Butte.

NEBRASKA—Constructors Equipment Co., Denver 5, Colorado.
Fehrs Tractor & Equipment Co., 1809-11 Cuming St., Omaha 2.

NEVADA—The Euclid Road Machinery Co., Emeryville, Monrovia, California.
Foulger Equipment Co., Salt Lake City 8, Utah.

NEW HAMPSHIRE—Clark-Wilcox Co., Boston 34, Mass.

NEW JERSEY—L. B. Smith, Inc., Camp Hill, Penna.
Hubbard & Floyd, Inc., New York 51, N. Y.

NEW MEXICO—Lively Equipment Co., 2601 No. Fourth St., Albuquerque.

NEW YORK—Hubbard & Floyd, Inc., 151st St. & Gerard Ave., New York 51.
T. E. Potts Equipment Co., 2260 Sheridan Dr., Buffalo.
L. B. Smith, Inc., 357 W. Fayette St., Syracuse 2; 134 State St., Albany.

NORTH CAROLINA—Hampton Roads Tractor & Equipment Co., Norfolk, Virginia.
North Carolina Equipment Co., P. O. Box 880, Greenville; Pineville Rd., Charlotte; Sweeten Creek Rd., Asheville; P. O. Box 128, Guilford; P. O. Box 685, Wilmington.

NORTH DAKOTA—The Euclid Road Machinery Co., Hibbing, Minnesota.

OHIO—The W. W. Williams Co., 835 Goodale Blvd., Columbus 8; 18301 Brookpark Rd., Cleveland 11; 914 Main St., Cincinnati 2; 1260 Conant St., Toledo (Maumee).

OKLAHOMA—The Euclid Road Machinery Co., Dallas 1, Texas.

OREGON—Intermountain Equipment Co., Boise, Idaho.
P. L. Crooks & Co., 2145 N.W. Pettygrove St., Portland.

PENNSYLVANIA—Atlas Equipment Corp., 635 Ridge Ave., Pittsburgh 12.
Standard Equipment Co., 152 Horton St., Wilkes-Barre; Hepburn & Lycoming Sts., Williamsport.
L. B. Smith, Inc., Camp Hill (Harrisburg); 29th & Montgomery Avenue, Philadelphia.

RHODE ISLAND—Clark-Wilcox Co., Boston 34, Mass.

SOUTH CAROLINA—Southern Equipment Sales Co., Sumter Highway, Columbia.

SOUTH DAKOTA—The Euclid Road Machinery Co., Hibbing, Minnesota.

TENNESSEE—Euclid-Memphis Sales, Inc., 185 E. Butler Ave., Memphis 2.
Power Equipment Co., 1218 Island Home Ave., Knoxville; 500 W. Manning St., Chattanooga.

TEXAS—The Euclid Road Machinery Co., 2524-2t Main St., Dallas 1.
Lively Equipment Co., Albuquerque, New Mexico.

UTAH—Foulger Equipment Co., 1361 So. 2nd West, Salt Lake City 8.

VERMONT—Clark-Wilcox Co., Boston 34, Mass.

VIRGINIA—Hampton Roads Tractor & Equipment Co., W. 39th and Killam Ave., Norfolk.
Rish Equipment Co., 1601 Chamberlayne Ave., Richmond 10; 408 Center Ave. N.W., Roanoke 7.

WASHINGTON—A. H. Cox & Co., 1787 1st Ave. So., Seattle 4; 2015 Center St., Tacoma; 313 North Mission, Wenatchee.
P. L. Crooks & Co., Portland, Oregon.
Intermountain Equipment Co., E. 611 Sprague Ave., Spokane 3.

WEST VIRGINIA—Atlas Equipment Corp., Pittsburgh 12, Pennsylvania.
Rish Equipment Co., Kanawha Blvd., Charleston 23; East on U.S. 60, Clarksburg; P.O. Box 269, Bluefield.
L. B. Smith, Inc., Philadelphia, Penna.

WISCONSIN—Euclid-Chicago Co., Chicago 31, Ill.
The Euclid Road Machinery Co., Hibbing Minn.

WYOMING—Constructors Equipment Co., Denver 5, Colorado.
Foulger Equipment Co., Salt Lake City 8, Utah.

Dependable... PROFITABLE PERFORMANCE

YEAR IN AND YEAR OUT!

Rear-Dump "Eucs" have capacities ranging from 10 to 34 tons with diesel engines of 125 to 380 h.p. This 15-ton model, with top extensions, is being loaded on a highway construction job in Massachusetts.

Euclids are designed and built for long life and heavy duty service in off-the-highway hauling. Where the going is tough—in open pit mines and quarries . . . and off-the-road construction and industrial work—"Eucs" have earned their reputation for rugged staying power, continuous operation and low cost production.

There are models for your every hauling requirement . . . body designs for every type of material . . . and the speed and capacity to haul bigger loads faster and at lower cost per ton or yard moved.

Euclid owners know that they can depend on prompt, efficient service from a world-wide distributor organization. The services of a hauling equipment specialist and genuine Euclid replacement parts are available to keep operating and maintenance costs at a minimum.

Let your Euclid Distributor provide you with information on the Euclid line of earth moving equipment . . . call or write today.

Euclid Scraper picks up a heaped load on an airport job in North Carolina. Capacity is 15.5 cu. yds. struck . . . 275 h.p. diesel engine.

Bottom-Dump Euclids range in capacity from 13 to 25 cu. yds., have diesel engines of 190 to 300 h.p. This "Euc" is hauling approximately 30 cu. yds. at a big earth fill dam in Colorado.

MORE LOADS PER HOUR— MORE PROFIT PER LOAD

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

EUCLIDS Move the Earth

Crews Get Workout In Bridge Collapse

Emergency Repairs Rushed After Truck Wrecks Span of Steel-Truss Structure Over White River

• SUNDOWN. Saturday night. March 24, 1951.

Ten miles west of Eureka Springs, Ark., where White River murmurs through the Ozarks, a peaceful community was quiet. Farmers were finishing up late chores, and a cafe owner at the right abutment of the White River Bridge had just served a cup of coffee to a tourist. A young couple, with youthful fire shining in their eyes, sat in a booth sipping Cokes.

Suddenly from higher up the mountain, where U. S. 62 comes down from Gateway, there came the roar of an engine laboring at high speed. A new International truck, with two youths in the cab, careened down the highway. Almost before the horrified people in the cafe could crane their necks, it had happened. With a sickening crunch, the truck plowed into the structural members on the outside of the curve. It was the same as if a pile-driver hammer had hit the structure. Unseated by the force of the crash, the 130-foot inshore span hung for a moment, then quickly twisted and crumpled. Somehow the truck, entangled in the wreckage, went to the bottom. In an instant, truck and bridge span had fallen to the White River floor, 50 feet below.

As the deck settled over the truck cab, Gerald Henson, 17, the passenger, stumbled clear of the wreck. Loy Ray Wagoner, 18, the driver, lay stunned and shocked at the wheel, unable for a few minutes to move. Soon he was blinking his eyes and trying to get out.

The cafe owner, running out horrified by the bedlam of noise, heard the rumble of a car coming in the opposite direction over the two 130-foot spans still standing. Wildly he waved his flashlight in the early dusk. Slowly the other car came to a halt with a screech of brakes on the bridge floor. When the driver took in what had happened, he quickly moved back to flag oncoming traffic.

Highway Engineer Notified

It was almost 10:30 p.m. when the telephone rang at the home of Jewell Whitaker, District Maintenance Superintendent at Harrison, Ark. It was the Arkansas Highway Patrol calling. The message was simple and to the point. Whitaker heard what had happened.

"Did you put barricades up?" he asked.

Assured that the highway was barricaded to prevent a further wreck that night, Whitaker jotted down the facts and thanked the Highway Patrol, with whom he works very closely. "We'll get busy right away and try to replace the span," he promised.

Whitaker then placed calls to Chief Engineer A. E. Johnson and Bridge Maintenance Engineer John Strom, of the Arkansas Highway Department. It was almost midnight.

"Strom and I will leave Little Rock right away," Johnson said. "Wait for us and we'll be right up."

It was daylight when Johnson, Strom, Whitaker, and State Maintenance Engineer J. H. Harmon reached the scene. In the meantime, Whitaker had routed his sign painter out of bed to start work immediately on warning signs.

Span a Total Wreck

Fifty feet below the abutment seat level, the bridge lay crumpled and twisted in the waters of White River. Part of the wreck, including what remained of the new truck, lay on shore. A thorough inspection showed what an incredible thing had happened. The two boys in the truck had survived the awful crash, but both the truck and the bridge span were a total loss. Not a single steel member in the bridge span was straight any longer. The only salvageable parts were about half the boards on the old floor.

"What a mess!" Whitaker exclaimed. "And the tourist traffic is just beginning. They'll want that bridge."

(Continued on next page)

Arkansas Highway Department Photo

Twisted and crumpled, this bridge span plunged 50 feet to the river bed below. Two boys survived the plunge of the truck . . . . below the bridge wreckage

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Ask your Texaco Lubrication Engineer for full details on the Texaco Simplified Lubrication Plan which requires *only six lubricants* for all major needs. This remarkable plan simplifies your lubrication setup, saves time, trouble and money. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO REG. T.M.

TEXACO

It was Strom who picked up the ball and carried it from there. "We've got that bridge near Little Rock that won't be needed now that they've re-routed the highway", he said.

"Isn't that a 150-foot span, though?" Johnson asked. "This is 130."

"That's O.K.", Strom replied. "We'll take it through Arkansas Foundry at Little Rock and let them take 20 feet out of the center. We can cut it loose, knock out the rivets, and bolt it together up here. That'll save time."

Fine details remained to be ironed out. The bridge near Little Rock was a slightly different type of structure than the steel-truss span the truck had knocked down. The deck level was different, and the deck on the Little Rock bridge was concrete, while that on the Eureka Springs structure was wood. Field adjustments would have to be worked out. In the meantime, every man there realized what speed would be necessary in reconstruction. Northwest Arkansas is an Ozark Mountain playground, and local groups wouldn't tolerate the re-routing of traffic around their places of business very long before the Governor heard about it.

"You can have anything the Arkansas Highway Department owns to get this job done", Johnson said.

C. & E. M. Photo

Traffic is again routed over White River Bridge in Arkansas, now that the 130-foot span, nearest the camera, which was knocked out by a truck wreck, has been replaced.

"Fine", said Strom. "I'll get to Little Rock and start dismantling the old bridge." He turned to Whitaker. "And you and your gang can start cleaning up the wreck. Give some thought to how we'll set the steel, will you? I'll call you later."

Whitaker's men started to work immediately. Truck traffic was re-routed through Huntsville over State Routes 68 and 21. Automobile traffic was routed over a county road, approximating the same mileage as Route 62.

Cutting torches went to work. The old span floor was partly salvaged, but the structural steel was twisted and warped beyond repair. As workmen cut the pieces loose, an Insley crane lifted the pieces up to the right-abutment roadway level. The material was advertised and sold for junk on the spot.

Meanwhile, Strom was busy near Little Rock as a gang under his supervision worked a 12-hour shift to dismantle the old bridge. The rivets were cut loose and the bridge was dismantled a piece at a time. The pieces were carefully marked so they could be erected in short order at White River. In general, it was possible to dismantle the bridge in the order of erection. The members to be shortened were trucked to Little Rock to Arkansas Foundry, where the shortening was done. The adjusted pieces, and those ready to use "as was", were then trucked to White River.

Conferences between Strom and the other engineers had pointed out a way to erect the span even before the first pieces began to arrive 2 weeks after the wreck. Cutoffs of H piling salvaged from a bridge just completed were driven 8 feet through the gravel bed to solid rock, 57 feet from the first pier. The White River, especially in the spring, often rises 30 to 40 feet overnight. Therefore, a 3-foot-thick concrete pad was poured on the H piling and a well braced double bent of timber piling firmly anchored on the concrete pad. Another concrete pad was poured on the solid rock 17 feet from the new abutment and a single bent erected. On the pier a 12 x 12 with proper supports was bolted to the pier to support four 24-inch-wide flange beams 60 feet long which reached the double bent; four more beams extended from the double bent to the single bent near the abutment. These beams were used as falsework and the structural steel erected without incident. The bolts were placed and tightened. Hydraulic jacks were used to muscle in some of the members, and to adjust the span properly over the anchor bolts.

Because of the necessity for speed, it was impossible to replace the old concrete deck. New 4 x 10 and 4 x 12-inch oak timber was purchased locally to make the new floor. The flooring timbers were laid crosswise, with the 10 and 12-inch sides up. A heavy 6 x 8 oak timber lies along each edge of the decking, and is bored to take a ¾-inch J-bolt which reaches through to the lower structural members and bolts down tight to hold the flooring planks in position.

Telephone conferences, a smooth organization, and from 10 to 12 hours work a day made the emergency repair click like clockwork. On May 17, less than 60 days after the worst bridge disaster on record in that part of the country, the bridge was again opened to traffic. And the emergency span is smoother and quieter than the existing two spans. The concrete which had to be jackhammered and chiseled off the riverward pier seat to make the new bridge fit 4 feet lower down is holding the new span in good shape. The transition between spans is so smooth it is scarcely noticeable.

How about Henson and Wagoner, the two boys in the truck?

Investigations showed that the two boys were delivering a load of lumber to a south Missouri town on the disastrous trip, and were returning light when the wreck occurred. Coming down the hill, the truck was traveling too fast.

(Concluded on next page)

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TO KEEP your machinery on the job and out of the repair shop, lubricate all Diesel and heavy-duty gasoline engines with *Texaco Ursa Oil X★★*. Detergent, dispersive *Texaco Ursa Oil X★★* prevents carbon, gum and sludge . . . stands up under heat and pressure . . . gives bearings full protection against wear and corrosion, even under severest operating conditions. Result — powerful, dependable performance . . . less down time . . . fewer repairs.

Cost-saving *Texaco Ursa Oil X★★* keeps rings free and ports open for better compression and combustion. Fuel consumption is reduced, parts last longer and maintenance costs drop. Operators everywhere report more reliable and economical engine performance, thanks to *Texaco Ursa Oil X★★!*

For savings in chassis lubrication, use *Texaco Marfak*. Its tough, adhesive protecting film assures greater protection for longer periods between overhauls. *More than 400 million pounds of Texaco Marfak have been sold!*

In wheel bearings, use *Texaco Marfak Heavy Duty*. It seals itself in the bearings and seals out dirt and moisture, won't leak onto brakes . . . requires no seasonal change.

Crawler track mechanisms run better, last longer when protected with *Texaco Track Roll Lubricant*. Better protection against moisture, dirt and wear under all operating conditions.

Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

Crews Get Workout In Bridge Collapse

(Continued from preceding page)

to make the sweeping curve at the bridge approach. The truck was a total loss, except for its junk value.

Maybe some insurance to protect themselves and the State?

The dealer who sold the truck 3 months before the wreck said he had to lend $100 to permit the buyer to make the down payment. There wasn't a nickel's worth of public liability or property-damage coverage. Compulsory upset and collision insurance will cover the truck itself. Both boys recovered from their experience.

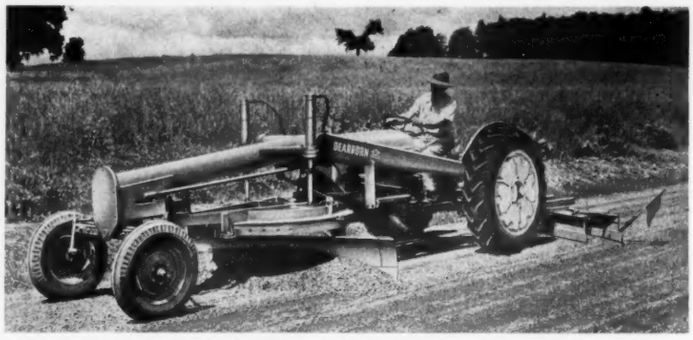
The Arkansas Highway Department spent about $20,000 to replace the bridge, plus the cost of timber flooring which was purchased locally. Material for the false bent was available from the Department depot at Jacksonville, Ark., and can be re-used later on.

The speed with which repairs were made has created much local good will for the Highway Department, and in that respect the Highway Department is richer for the experience. Crews beat the schedule the Arkansas Highway Department had set for itself by about 3 weeks, and residents of this part of the state, who depend for a living mostly on tourist trade, will not forget it for a long time.

New Road Maintainer Is Tractor Powered

A new road maintainer powered by a standard Ford tractor and designed for low-cost grading and leveling has been introduced by Dearborn Motors, 2500 E. Maple Road, Birmingham, Mich., national marketing organization for the Ford tractor and Dearborn farm equipment.

The 8-foot blade of the maintainer is operated by a separate hydraulic mechanism powered directly by the Ford engine crankshaft, thus freeing the Ford tractor hydraulic mechanism to operate accessory equipment. It is possible to use the blade in three pitch positions and nine angle positions and to lift it 9½ inches above the ground—all through positive hand levers or hydraulic controls convenient to the operator. The blade has a replaceable cutting edge and end bits. Maximum blade pressure is 3,500 pounds with the blade at a 90-degree angle to the frame, the company says.



The new Dearborn road maintainer, with a hydraulically controlled 8-foot blade, is powered by a Ford tractor.

Featuring an all-welded tubular-steel frame, the Dearborn road maintainer, complete with the Ford tractor, weighs 6,900 pounds. It is 18 feet long and 6 feet 8 inches wide. The entire maintainer attachment can be removed from the tractor in approximately 3 hours, the manufacturer reports. A Dearborn side-mounted mower can then be installed on the tractor for highway mowing. In some cases, the mower can be installed without removing the maintainer attachment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 436.

Wire-Rope Recommendations

A 40-page catalog recommending types of Tiger Brand wire rope for various services in construction, marine and industrial work has been prepared by American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, Ohio. For convenience and ready reference, the recommendations are indexed under major fields of service. Equipment utilizing wire rope is listed under major headings such as bulldozers, mixers, cranes, scrapers, dredges, etc.

Reeving diagrams are shown for excavating and hoisting machines. Many on-the-job photos illustrate the machines in operation. Additional data and recommendations are given for working loads, safety factors, and drum and sheave sizes.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle 506.

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MODEL 363

PORTABLE CONVEYOR

Complete accessories are available to make the 363 Conveyor adaptable to the widest variety of operating conditions. It is shown here unloading a hopper car with a B-G 358 unloader.

HANDLES ALL MATERIALS: Sand, stone, gravel, wet concrete, chemicals, coal, etc.

UP TO 200 T.P.H. CAPACITY: Available in lengths of 25', 30' and 35', plain or cleated 24" belt.

NO CHAINS, NO SPROCKETS: Power transmitted from gear reducer through shaft to the head-end drive—sturdy, maintenance-free construction.

25 MILES PER HOUR TOWING SPEED: Pneumatic tires, coil springs, shock absorbers, convenient towing hitch.

RUGGED B-G CONSTRUCTION: Designed for maximum strength, minimum weight.

FULL SWIVELING WHEELS: For radial stockpiling as desired.

ALL PURPOSE: Built for contractors, material yards, concrete product plants; aggregate plants, gravel pits, City, County and State Highway Departments, etc.

SEE WHAT ONE MAN CAN DO...

He can tow it to the job behind his truck . . .

. . . load his truck and move on or keep a whole fleet of trucks on the move . . .

. . . unload hopper cars direct . . .

. . . or, for higher capacity, place the plasma and at a similar truck pit . . .

. . . he can place ready-mix concrete directly into the forms . . .

. . . or unload dry batches for delivery into ready-mix trucks . . .

BARBER-GREENE COMPANY
AURORA, ILL., U. S. A.
See your B-G Distributor

The new Barker Rim Circle saw will cut timber up to 30 inches in diameter. It is powered by a single-cylinder gasoline engine.

New Circular Saw Cuts 30-Inch Timber

A new portable saw, designed to operate in any position while cutting timber up to 30 inches in diameter, has been engineered by Barker Saw Co., Box 925 Commercial Sta., Springfield, Mo. For safe operation, the blade is encased in a frame with guards for protection; a hook firmly holds the saw to the timber; and the blade rotates away from the operator.

The Barker Rim Circle saw consists of a circular 3-inch band of steel 30 inches in diameter with outside cutting teeth. It is also available with a 20-inch blade. Encased in an aluminum alloy frame, the saw is held in position by three ball-bearing steel rollers. It is powered by a single-cylinder air-cooled gasoline engine. The whole outfit weighs 85 pounds. The company points out that the saw blade can be filed or set without being removed from the frame.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 441.

A New AC Generator

The new high-frequency ac generator manufactured by the Kato Engineering Co., 1415 First Ave., Mankato, Minn., has a capacity of 75 kva and generates 400 cycles at 1,714 rpm. It is of the revolving-field type with the field coils energized from a 125-volt dc exciter directly driven from an extension of the alternator shaft.

Features include a cooling fan designed to hold the temperature rise to less than 40 degrees C and pre-lubricated ball bearings for the main alternator shaft. The net weight is 1,325 pounds; over-all length is 49 inches; height, 21½ inches; width, 21 inches. These dimensions are without outlet box or instrument cabinet.

These high frequency generators are available in both single and three-phase. Frequencies ranging from 300 to 500 cycles are possible by a change in winding and in operating speed. The generators have either engine-drive or motor-drive.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 504.

LeTourneau Intends To Roll Its Own Steel

The critical shortage of steel has prompted R. G. LeTourneau, Inc., Peoria, Ill., to build its own steel mill at its Longview, Texas, plant. The 100 x 500-foot mill, whose foundation has been poured, is expected to be in operation by the end of this year, and will be able to turn out 1,000 tons per day of finished steel plate 144 inches wide and 3/16 inch to 12 inches thick.

Nearly all the equipment—ladles, furnaces, roller leveler, manipulating equipment, and runout tables—is being manufactured in the company plants. The mill will be an integrated installation with two electric furnaces and a complete rolling mill. The ingots poured from these furnaces will be made from LeTourneau scrap and scrap purchased in the Longview area. The plant is expected to cost almost $1,000,000.

Bob Johnson Dies

Clarence R. "Bob" Johnson, district representative for the western sales division of Caterpillar Tractor Co., died of a heart attack at the age of 61 in Sacramento, Calif. He was district representative and branch manager for Cleveland Tractor Co. until 1927 when he joined Caterpillar as a district representative for the eastern sales division.

Johnson held this position until 1935 when he was transferred to the western sales division at San Leandro, Calif. A year later he was named assistant sales manager for the western sales division and continued in this capacity until his return as a district representative in 1940, a position he held until his death.

Articles on Bituminous Resistance Summarized

A bibliography on research to determine the resistance of bituminous materials to deterioration has been prepared by a committee of the Highway Research Board, and is now in print. The committee decided that the most important causes of such deterioration were volatilization, oxidation, action of water, action of light, and changes occurring in the internal structure of the bituminous material. These factors were used as the basis for the preparation of the bibliography.

The bibliography covers the years from 1906 to 1949. It gives abstracts of all articles. Copies may be obtained from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. They are 75 cents each.

The MOORHEAD Portable Aggregate Drier

is used on numerous types of work where it is the purpose to heat and dry materials preparatory to mixing. The material is thrown or discharged into the hopper and thoroughly dried and heated in traversing the length of the trundle by the intensely hot flame of the burner.

The unit is sturdily constructed and may be attached to any vehicle. Drier has a capacity of from 5 to 10 tons per hour. Furnished with electric motor and on skids for stationary use.

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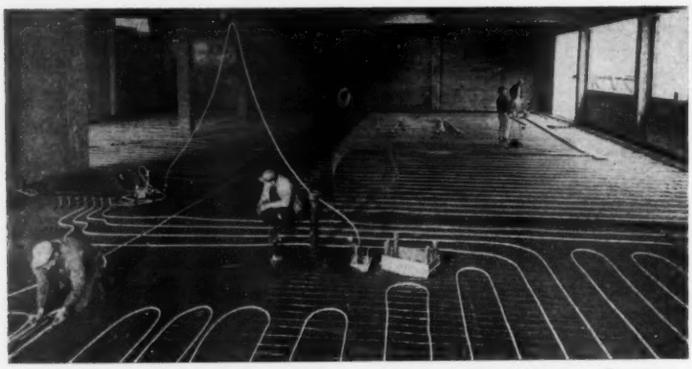

Workmen lay Carlon C plastic tubing for a radiant-panel floor-heating system in a Portland, Oreg., industrial plant.

Plastic Tubing Used For Radiant Heating

Carlon C plastic tubing was used for a radiant-panel floor-heating system in a Portland, Oreg., industrial plant. Made by Carlon Products Corp., 10225 Meech Ave., Cleveland 5, Ohio, this product resists rot, rust, and electrolytic corrosion; is easy to install; and has a low frictional loss.

In the new plant buildings in which it was installed, the tubing was first laid on rough flooring and held in position with hooks while return bends were made. Wire mesh was then placed over it and tied to it at 2-foot intervals with binder twine. The hooks were removed after the tubing was secured, and the entire system was filled with water to eliminate air in the line. To prevent collapse of the plastic tubing, pressure was maintained on the system while 2½ inches of concrete were poured. The tubing was also installed in existing plant structures to convert them to radiant heating.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 406.

Tishman Vice President

George Fred Pelham II has been elected Vice President in Charge of Design for Paul Tishman Co., New York City contractor. Before joining the Tishman firm Mr. Pelham was an architect in private practice. During World War II he was an executive with the Airport Development Program.

This new heavy-duty lifting and loading boom has been developed by Schield Bantam Co. for its truck-mounted Bantam shovel crane.

New Heavy-Duty Boom

A new heavy-duty boom, designed for lifting and loading with the 5-ton truck-mounted Bantam shovel-crane, has been announced by Schield Bantam Co., Waverly, Iowa.

The Bantam boom is available in a 25-foot length with 5-foot extensions and has a 10,000-pound capacity at 10 feet, with outriggers and 1,000-pound counterweight. It has heavy reinforcing and bracing to resist shock and sling load conditions, the company says. Strength is achieved through the use of heavy-duty angles, together with additional braces along the lower section for protecting the boom when dropped or bumped against other objects.

The new boom is intended to increase the work range of the truck-mounted Bantam, which is also available with shovel, trench hoe, backfiller, dragline, pile driver, magnet, and clamshell attachments.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 462.

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Concrete Dock Built; 2,800 Piles Precast

Concrete Pumped Through Pipeline to Both Casting Yard And Deck in Wharf Construction at Wilmington, N. C.

By WILLIAM H. QUIRK,
Eastern Editor

(*Photo on page 1*)

• DIAMOND Construction Co. of Washington, D. C., is building a new reinforced-concrete wharf for the North Carolina State Ports Authority at Wilmington, N. C., for an estimated cost of $1,901,369. Work on the structure got under way in July, 1950, and is expected to be completed early this fall. The wharf was designed by Robert & Co., Inc., Architects and Engineers, Atlanta, Ga., which is also supervising the construction.

Located on the Cape Fear River which forms a natural harbor on the Atlantic coast, the wharf is 1,500 feet long north and south x 221 feet wide. It consists of a reinforced-concrete beam-and-slab deck supported on RC piles. The slab is 7½ inches thick and the beams are 18 inches deep x 32 inches wide. Beams run transversely across the deck on 11-foot 3-inch centers directly over the pile bents driven on the same spacing. Bents contain 20 piles, spaced on 14-foot 8-inch centers, except for the outside 20 feet of dock apron where the spacing is reduced to 6-foot centers.

Concrete was mixed at a central plant set up on shore midway along the wharf. From there it was pumped either to the pile-casting yard along the southerly half of the wharf, or out on the wharf for the deck pours. The piles were incorporated into the beams which were poured with the slab. Finished elevation of the wharf is 12.5. The river at this point will later be dredged by the Army Corps of Engineers to a depth of minus 34.0 out to the channel.

Central Mixing Plant

One of the first moves on the part of the contractor was to lay a 1,900-foot spur track from a siding of the Atlantic Coast Line railroad which serves the Wilmington port area. This track will later be part of a lead to the new wharf, entering at the north end over a trestle built of greenheart timber, a hard and durable wood imported from British Guiana. Along with the trackwork, a batching and mixing plant was set up central to the project.

Aggregate enough for 80 yards of concrete was stored in a Blaw-Knox bin which was charged by a P&H crane equipped with an 80-foot boom and a Wellman ¾-yard clamshell bucket. Sand and gravel were furnished by the Superior Stone Co. from its Becker County plant near Fayetteville, N. C., and delivered by rail to the siding right alongside the plant. The crane unloaded the cars and stockpiled the material.

Lehigh bulk cement was also shipped by rail from the Fordwich, Va., plant, and unloaded by a screw conveyor and a Webster 50-ton-an-hour enclosed cement elevator into a Diamond-built 1,000-barrel cement silo. On a platform beneath the bins were two 2-yard mixers—a diesel-driven CMC and an electric-driven 56-S Koehring. Concrete was mixed in either or both at the same time, then discharged into a Rex 200 Pumpcrete machine below. City water was tapped for the mix and brought to the plant through a 3-inch line. Darex air-entraining admixture was put in each batch, resulting in an average 3½ per cent of air in the mix.

C. & E. M. Photo

A barge-mounted Wiley Whirley sets concrete piles for the Wilmington, N. C. dock.

For the precast piles, the mix used had the proportions 1 : 1.60 : 2.73, with 6.75 bags of cement to the yard and 5 gallons of water per bag of cement. With this mix the specifications were met requiring 3,750 psi concrete at 28 days. In the deck concrete the mix was

(Continued on next page)

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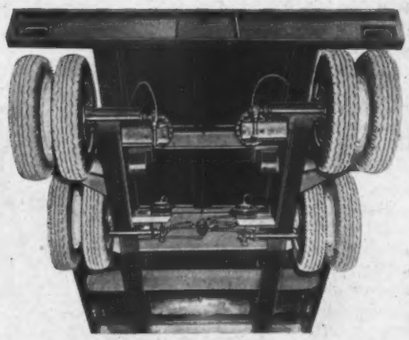

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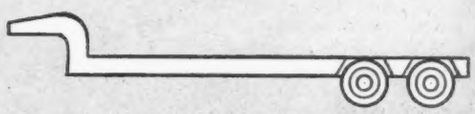

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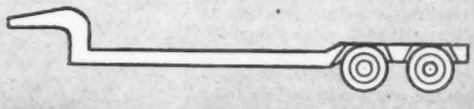

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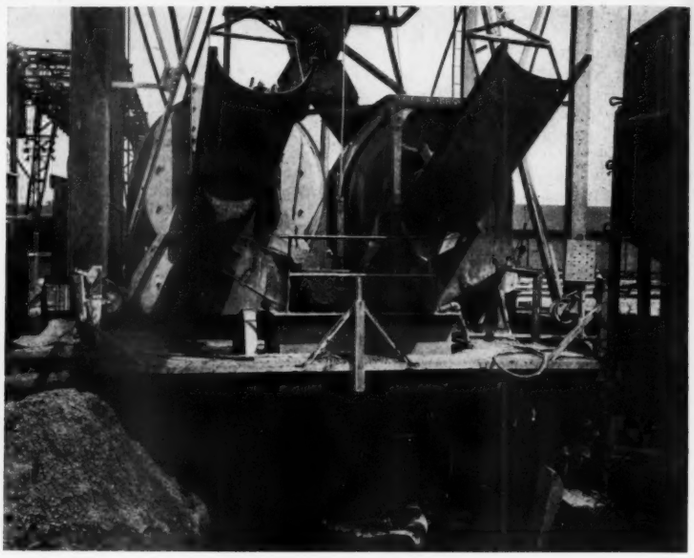

C. & E. M. Photos

At the concrete batch plant Diamond Construction Co. set up, a P&H crane with a Wellman bucket charges a Blaw-Knox aggregate bin with sand (above). At right are the two plant mixers—first a diesel-driven CMC and next to it an electric-driven Koehring 56-S. Concrete is discharged to the Rex 200 Pumpcrete below.

Concrete Dock Built; 2,800 Piles Precast

(Continued from preceding page)

1 : 1.98 : 3.38, with 5.6 bags of cement to the yard and 5½ gallons of water per bag of cement. The resultant concrete had a strength of 3,000 pounds.

Pile Casting

The wharf is made up of 2,800 reinforced-concrete precast piles, varying in length from 45 to 63 feet with the average length about 55 feet. They have octagonal cross sections in two sizes—16¾ and 19½ inches. The larger piles comprise about two-thirds of the job, and were driven in the outer portion of the wharf where the water is deeper. The remaining third, with the smaller cross section, were driven closer to shore. Piles were reinforced with eight vertical rods—1-inch in the large piles and ⅞-inch rods in the smaller piles—and with wire hoops. The Virginia Steel Co. of Birmingham, Ala., supplied reinforcing steel for the project.

The pile-casting yard took in an area 450 feet long x 70 feet wide. Wooden forms were used, constructed out of 1¼-inch dressed lumber braced with 2 x 6's. The base portions of the forms were fixed in the ground to remain in place for the total casting, but the side forms were moved after every pour. Enough side soffits were on hand to cast 120 piles; pile production averaged 100 a week, with the contractor working a single shift.

From the Pumpcrete machine at the plant, an 8-inch pipeline was laid underground as far as the inside edge of the casting yard. Being underground, the pipe did not interfere with other work going on at the job site or with the movement of equipment. At the pile yard it was raised onto wooden horses and carried down the full length of the casting area. Three hoppers were placed equal distances apart along the line, one near each end and the third at the center of the yard. The pipeline was broken at the hopper nearest to the piles being cast, and the concrete discharged into the metal bins holding 3 yards of concrete.

Laborers pushed Jackson rubber-tired carts which were loaded with concrete from the hopper. A system of wooden runways was laid out over the forms so that the carts made a complete circuit from hopper to form and back to hopper. From their location atop the forms, the runways were at a good height for easy dumping of the carts. Metal troughs were used in filling the forms to prevent spillage of concrete, which was vibrated with a Mall vibrator as it was placed. All concrete, for piles and deck, was sprayed with Kuraseal curing compound.

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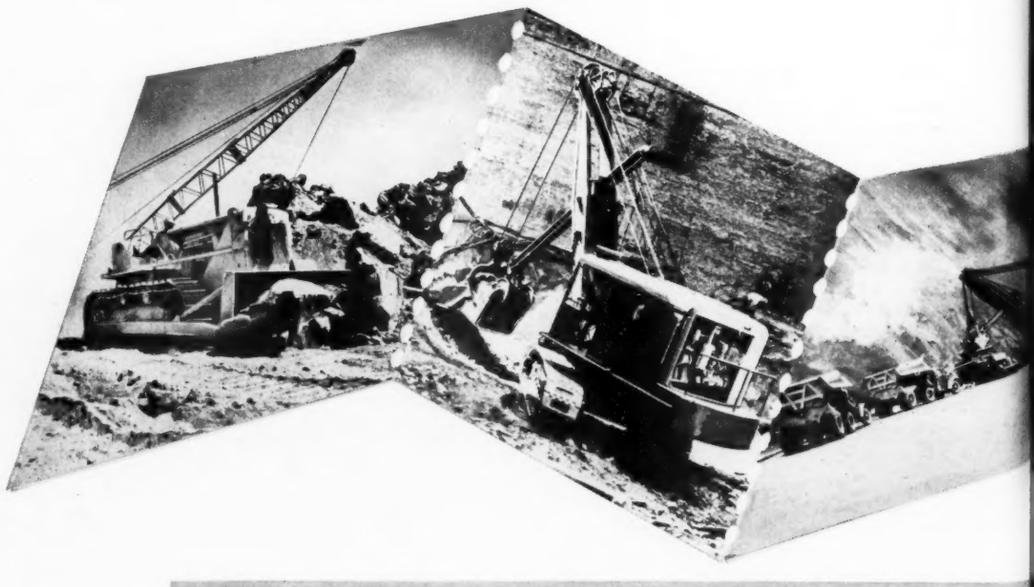

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C. & E. M. Photo

At Diamond's pile-casting yard, concrete is discharged from an 8-inch Pumpcrete line into a 3-yard hopper and then into Jackson rubber-tired carts.

C. & E. M. Photo

Another view of the pile-casting yard shows the wooden forms being filled with concrete and the runways on which the carts were pushed.

Pile Driving

Three big revolving cranes—one land and two floating rigs—were responsible for handling and driving the heavy piles. The land machine was Diamond-built with a 35-ton capacity and an 80-foot boom; it operated on rails 15 feet apart on centers. This big gantry unit straddled two railroad tracks running along the dock; its own track was 1,500 feet long. No. 11, as it is called, lifted the piles from the forms, stockpiled them, and loaded them on material barges as they were needed by the floating drivers. This land rig burned diesel oil.

No. 7 and No. 8 floating rigs were both Wiley Whirleys—35 and 45-ton capacity respectively, with 80-foot booms—and burned bunker C fuel oil. They were mounted on 35 x 70-foot steel barges which were spudded to the bottom when driving. No. 7 started driving first on the inner half of the pile bents working from south to north. A heavy double-truss steel template, 120 feet long, was used in setting and driving piles. The inside end of the template was supported on the river bank, while the outer end rested on a spud stuck into the river bottom. The driver first made a starting hole for the pile with a long and heavy section of steel H-beam used as a spud.

After these holes were made through openings in the template, the piles were set in place, then driven by a McKiernan-Terry 11-B-3 hammer. The entire inner half of the bents, except the last pile next to shore was driven in this manner. A special template was built to drive the row of piles along the bank. Where necessary, the No. 7 dug its own flotation along the river, which got shallower near the north end of the wharf.

A month after the No. 7 started driving, No. 8 rig began driving piles to complete the outer half of the bents. It used a similar type of template, with the inner end resting on a pile already in place, and the outer end supported on a spud. The same procedure was followed, with the H-beam spudding a hole in which the piles were set and driven. By the end of last March, No. 7 had completed the inner half of the pile work for the wharf and had moved along to drive the greenheart-timber piling for the trestle carrying the railroad lead onto the north end of the dock. The timber piles were driven by a 10-B-3 hammer. No. 8 rig completed the outer half of the pile driving by June.

Pouring the Deck

Wooden forms for the deck were supported on the concrete piles. First 8 x 10 toggles were bolted on two sides of each pile near the top, and running longitudinally with the dock. They held the 40-foot lengths of west-coast-fir 8 x 12 stay lashing on each side of the bent. For additional support, a hanger was installed at every other pile from the top of pile down to the toggle timbers.

Between the stay lashing on adjacent bents, 6 x 8's were laid across on 36-inch centers. They in turn supported 3 x 6's across the width of the wharf, three to a bay. Deck panel forms, made of 1¼-inch lumber backed with 2 x 6 studs on 14-inch centers, were then

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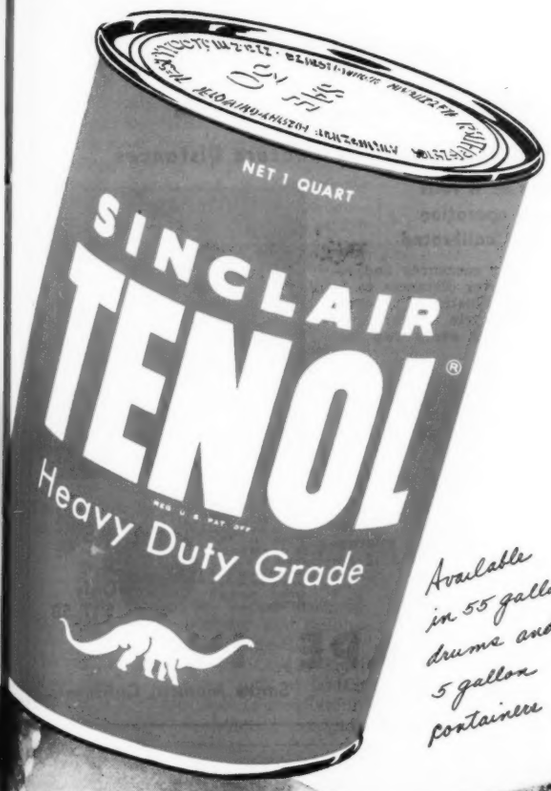

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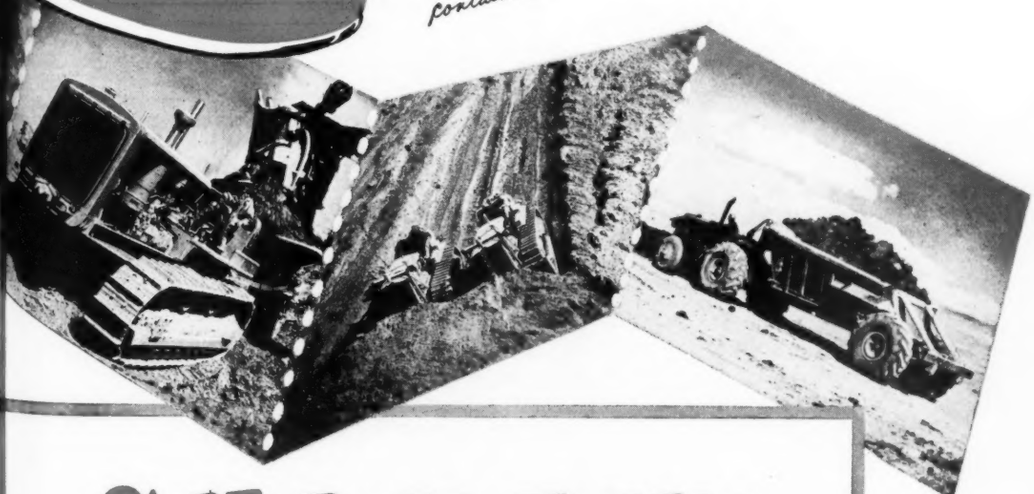

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Concrete Dock Built; 2,800 Piles Precast

(Continued from preceding page)

placed on the 3 x 6's. Panels were made in various lengths, but their width took in half a bay. A typical bay is 14 feet 8 inches x 11 feet 3 inches.

The deck was poured in sections 33 feet 9 inches long for the full 221-foot width. The Pumpcrete line was run out on wooden horses to the outer edge of the dock. As the concreting proceeded to the inner edge, lengths of pipeline were removed. No carts were used on the deck pours since the concrete was chuted directly into the forms. The first section of slab was poured in November, 1950, with about one section being laid per week while the pile driving was still in progress. On the deck the concrete was struck off with a screed made of a channel iron and timber, and given a finish with a length of rubber hose.

When the concrete had hardened, the forms were removed by loosening the toggle members bolted to the piles, and dropping the stay lashing. Rafts were needed on the outer half of the dock to receive the lumber, but on the inner half the backfill around the piles usually supported the men and forms. Pneumatic impact hammers and wrenches were used in the dock building, powered by a Worthington 315-cfm air compressor set up on deck.

Riprap on Land Side

A sheet-pile bulkhead along the harbor line in this area had been removed for the construction of the new wharf. To prevent any loss of ground through erosion or wave wash, riprap was placed along the bank at the inside edge of the wharf, and extending down on a flat 2 to 1 slope under the deck slab. First a 2-foot blanket of quarry-run material was laid on the slope, and this was topped by a 2-foot course of select granite riprap. A Lorain truck crane with a 45-foot boom handled the necessary excavation and riprap placing, and was available for general yard work and material handling.

Quantities and Personnel

The major items in the wharf contract include the following:

Reinforcing steel	1,500 tons
Reinforced-concrete piles	2,800
Concrete, deck	13,000 cu. yds.
Greenheart-timber piles	1,200 lin. ft.

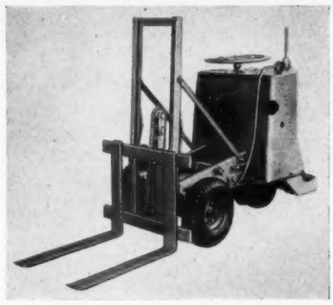
Future contracts to be awarded for the Wilmington, N. C., facility include the construction of two transit sheds and a warehouse to be built on the wharf.

Diamond Construction Co. has employed an average force of 150 on the project. Key personnel includes B. E. Crumrine, Superintendent; J. G. Stewart, Office Manager; and W. K. Stewart, Job Engineer.

Robert & Co., Inc., is represented on the wharf construction by W. A. Freret, Resident Engineer.

Half-Ton Fork Lift For a Power Buggy

A power-driven fork-lift attachment for the Moto-Bug power wheelbarrow is made by the Kwik-Mix Co., Port Washington, Wis. It has a 1,000-pound lift capacity and raises the load to a maximum height of 30 inches. For load balance, forks tilt to the rear when being raised and are adjustable to a maximum width of 33 inches. Standard forks are 20 inches long; 30-inch forks are optional. Direct steering to dual rear wheels allows the machine to turn in its own length. A 4-hp gasoline engine furnishes the power.



The Moto-Bug has a power-driven fork-lift attachment now. Its capacity is 1,000 pounds. It lifts to 30 inches.

Sturdy construction of the Moto-Bug includes an all-welded body and lower frame. The fork-lift attachment is interchangeable with the 10-cubic-foot hopper, a 32-inch x 4-foot flat-bed platform of 1,200-pound load capacity, or a 5-foot scraper blade. Total weight of the Moto-Bug with its fork lift is 1,400 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 482.

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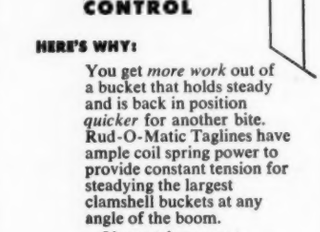

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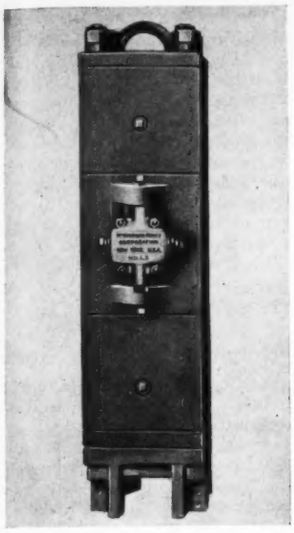

McKiernan-Terry's No. 6.5 hammer.

A New Pile Hammer For Close Quarters

A new double-acting pile hammer, designed primarily for driving steel sheet piling in close quarters, has been developed by McKiernan-Terry Corp., 15 Park Row, New York 38, N. Y. It is capable of driving one pile between two adjacent sheets, and is particularly adaptable for driving in sand, the company says. It normally operates at 280 blows per minute, with an energy of 3,200 foot-pounds per blow. Known as the No. 6.5, the new hammer is suitable for 8 to 15-inch steel sheet piling, or 6 x 12-inch wood sheeting, or the equivalent size of round timber piles.

A descriptive bulletin is available, with sectional drawings, complete specifications, dimensions, parts list, and instructions for attaching angle iron guides.

Further information may be obtained from the company by requesting Bulletin 58-A, or by using the Request Card at page 16. Circle No. 438.

Push-Pull Tractor

A torque-converter tractor designed to handle tough pushing and pulling jobs is manufactured by The Buda Co., Harvey, Ill. The Model HA-120 Shop Mule has a drawbar pull of 12,000 pounds. Its single-stage closed-circuit torque converter is designed to eliminate shock and strain.

The tractor is powered by a 6-cylinder gasoline engine with a 230-cubic-inch displacement. A diesel engine of the same displacement and with interchangeable mounting dimensions is optional. The HA-120 tractor has 4-wheel hydraulic brakes, a heavy-duty transmission with four forward speeds and one reverse, a 17-gallon Protectoseal fuel tank, an adjustable seat, and dual pneumatic drive tires.

Further information may be secured from the company by requesting Bulletin No. 1545. Or use the Request Card at page 16. Circle No. 407.

Scour Around Bridges

The Highway Research Board has published in booklet form two papers on scour around bridges which were presented at the Thirtieth Annual Meeting of the Board, January 1951.

The first paper, "Progress Report of Model Studies of Scour Around Bridge Piers and Abutments", by Emmett M. Laursen, Iowa Institute of Hydraulic Research, State University of Iowa, states the problem of underscour and outlines the plans for isolating and measuring the effects of the several variables involved. The work program of his investigation has been divided into four phases: (1) the geometry of piers and abutments; (2) hydraulic characteristics of the stream; (3) sediment characteristics; and (4) the geometry of channel cross section and alignment.

The second paper, "Investigation of Flexible Mats to Reduce Scour Around Bridge Piers", was written by C. J. Posey and D. W. Appel, State University of Iowa, Iowa City, and E. Chamness, Jr., Colorado A. & M. College, Fort Collins. Their studies showed that the greatest hazards to flexible mats were the tendency of upward currents to lift sediments through the mat, and the tendency of the mat to bridge or buckle due to bottom irregularities which caused underchanneling and dislocation of bed materials. The report includes a discussion of requirements for effective protection of erodible beds and offers suggestions for further research.

Copies of this bulletin, Research Report No. 13-B, may be obtained by writing to the Highway Research Board, National Research Council, 2101 Constitution Ave., Washington 25, D. C. Price: 45 cents per copy.

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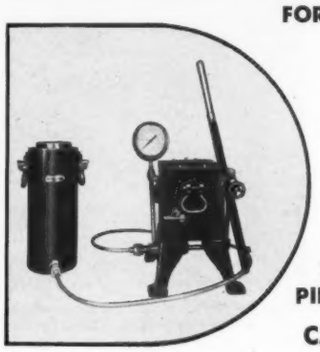

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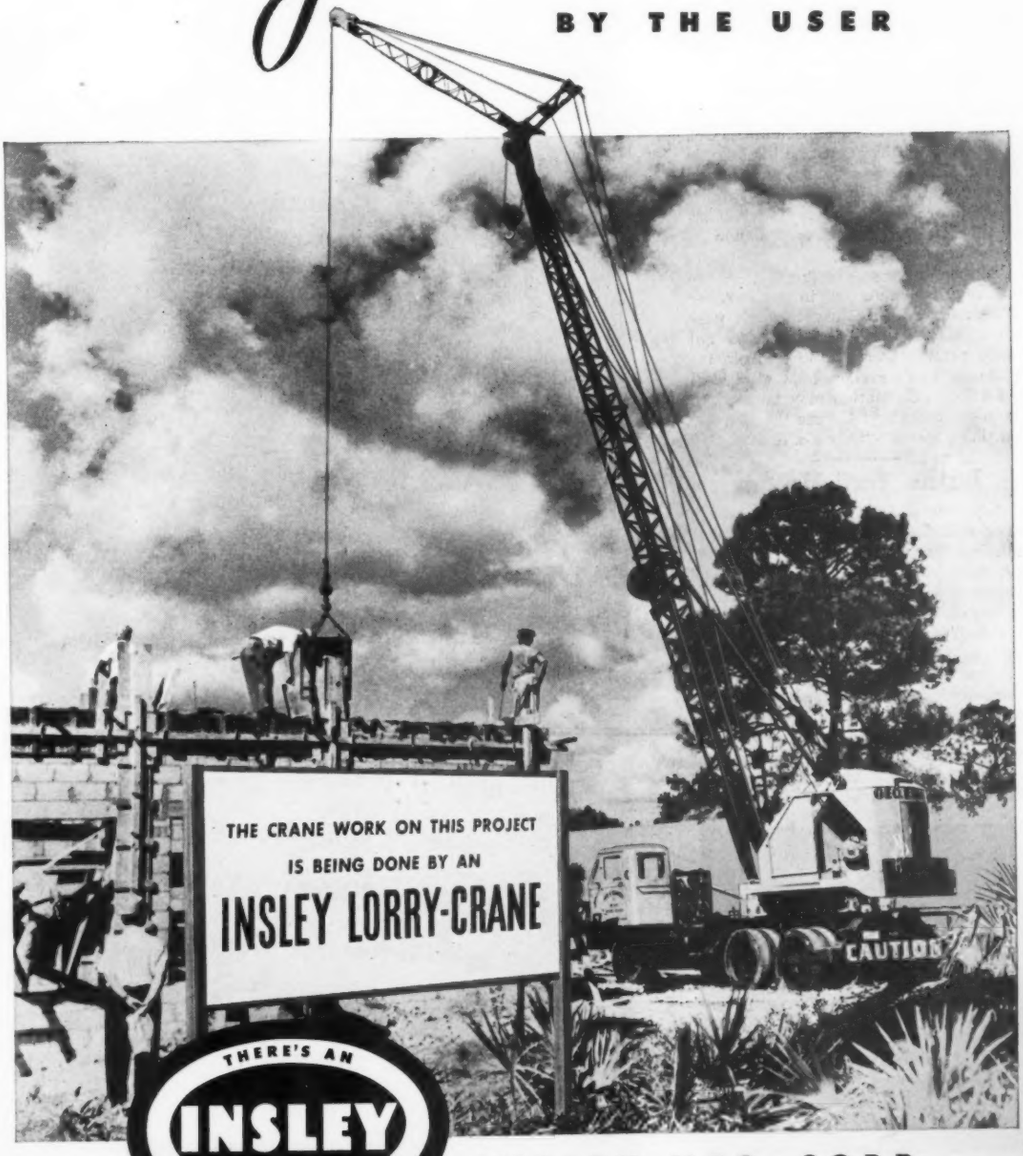

THERE'S AN INSLEY WORKING NEAR YOU

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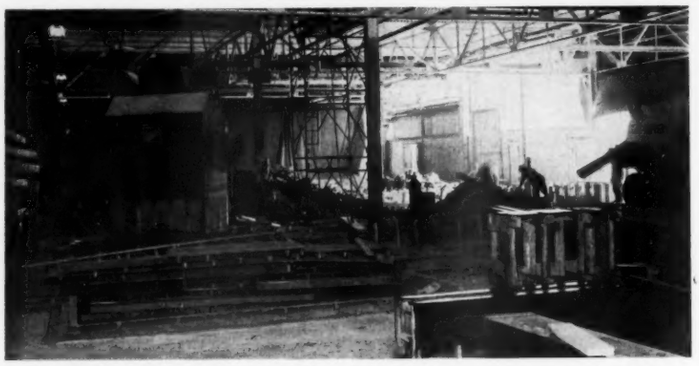
Oil-Fired Heaters Keep Ford Job Open

Six direct-fired oil heaters kept the unfinished Ford engine plant in Cleveland, Ohio, warm enough for inside construction work during the coldest weather last winter. Two of the heaters had a capacity of 2,000,000 Btu per hour each, and four delivered 1,500,000 Btu per hour each. They were mounted on timber skids for positioning. Two 250-gallon fuel tanks were also supported on skids.

The heaters, built by Dravo Corp., are said to blanket an area with warm air. They operate on a recirculating principle—warm air is discharged from four overhead nozzles at a velocity of some 2,000 feet per minute and drawn back from the floor level into louvered openings in the lower casing. Return air is forced over economizer tubes carrying flue gas to the vent stack. Then the air sweeps the heater's stainless-steel combustion chamber. The large heater handles approximately 22,000 cubic feet of air per minute and the smaller one handles approximately 17,000 cubic feet.

Metal vent stacks attached to the heaters discharged near roof level. When it was possible, openings were left in the metal deck roof so exhaust gases could vent outside. Tarpaulins were hung over the unfinished exterior walls of the 810,000-square-foot building and down its center line in order to close off one half of the structure.

Albert Kahn Co. is the architect. The general contractor is the H. K. Ferguson Co., and the heating contractor is Smith & Oby Co.



The unfinished Ford engine plant in Cleveland was heated by six Dravo direct-fired oil heaters last winter. They kept it comfortable and made concrete pouring possible.

Salt-Pill Dispenser

A new salt-tablet dispenser has been announced by General Scientific Co., 2700 W. Huntingdon St., Philadelphia 32, Pa. The dispenser may be mounted on any wall surface near the drinking fountain or water supply. The visibility of the 750 salt tablets is designed to invite consumption.

The company points out that everyone requires more salt in the summer months due to its loss through perspiration. If the loss of salt is not made up, the worker suffers from fatigue, or more serious heat ailments.

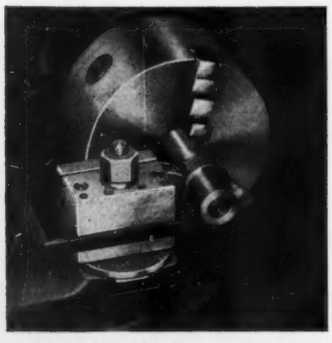
Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 470.

Lathe Tool Holder

A universal-type tool holder is made by South Bend Lathe Works, 425 E. Madison St., South Bend 22, Ind. It is supplied in five sizes for South Bend lathes and can be adapted for use on some other makes.

Constructed of heat-treated steel, this tool holder features screw adjustment for tool height. Once adjusted, tools of the same type can be changed without disturbing the height adjustment. The holder comes equipped with a self-aligning knurling head and a pair of medium diamond knurls. Coarse and fine diamond knurls, and coarse, medium, and fine straight-pattern knurls are available. The company also has boring tools, cutting-off blades, and a set of four ground cutter bits for boring, cutting off, turning, facing, and threading operations. The 10-in-1 Tool Holder is said to eliminate the need for the many different types of tool holders.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 495.



South Bend Lathe Works makes the 10-in-1 Tool Holder, which is shown here in knurling operation.

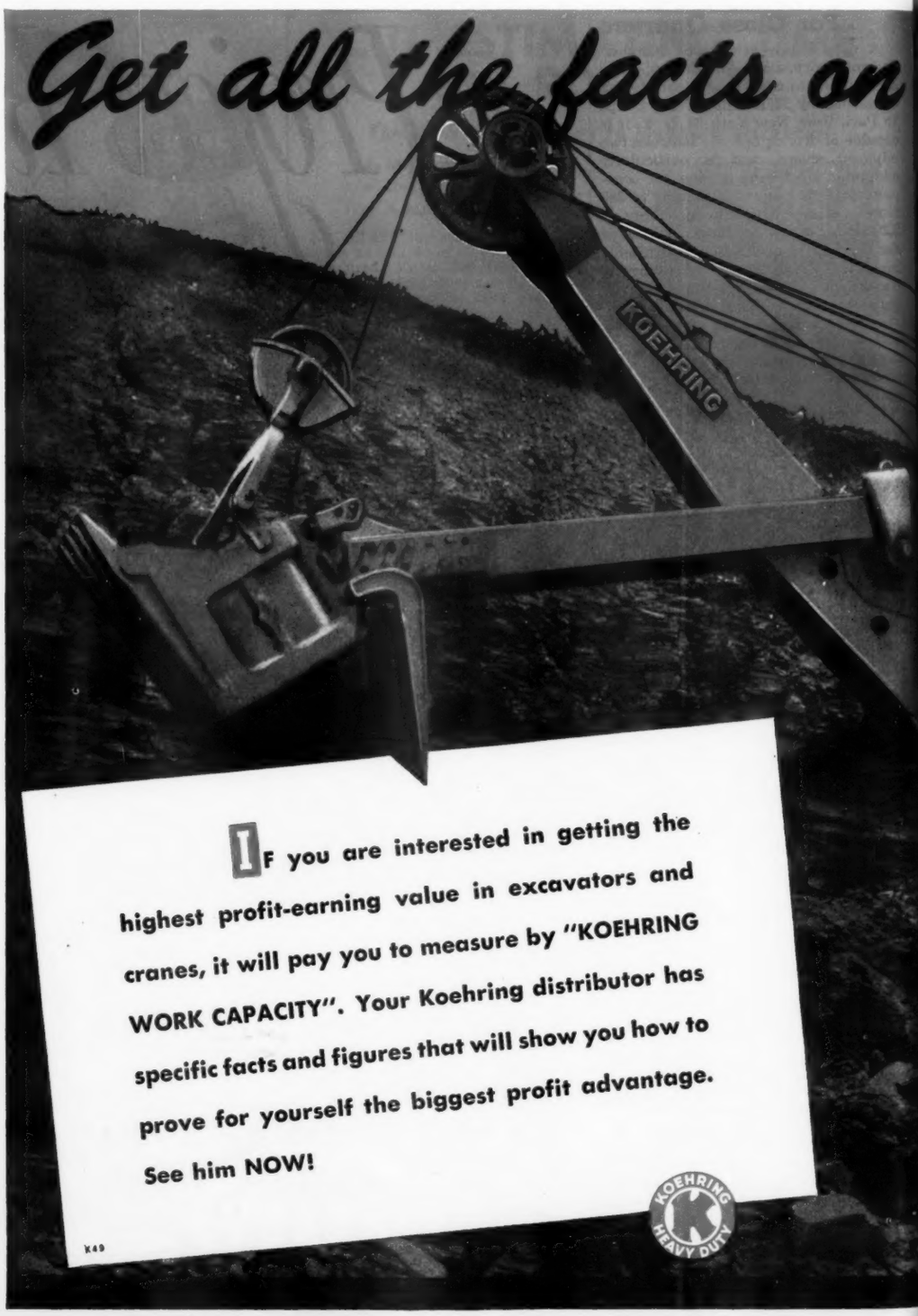
Building-Products Catalog

A 24-page booklet prepared by the Kaylo Division of Owens-Illinois Glass Co., Ohio Bldg., Toledo 1, Ohio, describes the structural and fire-resistant properties of the company's calcium silicate products. These products are used for insulating roof tile, and pipes and boilers, and for cores of firedoors and laminated building panels. The booklet supplies information on specifications, applications, and features.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 410.

Cummins Expands Again

The Cummins Engine Co., Inc., Columbus, Ind., is planning a two-year $6,000,000 expansion program. This is the third such program which Cummins has initiated within the last year. When complete it will increase the company's production capacity at least 50 per cent over the 1950 record high level.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A Rotary Snowplow Mounted on Crawlers

An adaptation of the Bros Sno-Flyr can be mounted on a Caterpillar D7 tractor. It was previously mounted only on heavy trucks and approved motor graders. Made by William Bros Boiler & Mfg. Co., 1057 Tenth Ave., S. E., Minneapolis 14, Minn., the new unit has 5 forward and 4 reverse speeds for graduated power. Power to drive the plow and rotors comes from two engines mounted on a special counterbalancing platform at the rear of the tractor. Diesel or gasoline engines with 200 hp or more may be used.

The entire plow assembly, driving motors, and supporting frames are mounted on the D7 as a single unit, which, with the aid of a light crane, can be quickly removed in the spring. The two power units are synchronized by a vacuum system; both have electric starting equipment. A 260-gallon fuel tank is between them.

The Sno-Flyr rotary is the latest Bros design. It has two 360-degree-revolving casting chutes, hydraulically powered and fingertip-controlled from the operator's cab. The tubular chutes can be adjusted separately or together to cast in any desired direction up to 150 feet, depending on the type of snow being handled. The operator can direct the streams away from cuts, ledges, side banks, buildings, or other areas where accumulation of snow could be dangerous. The dual moldboards clear a 9-foot swath. The patented slicer bars and the rotating feeding rakes work in deep drifts, slashing and chopping down packed snow for the rotor blades to pick up and hurl out.

Bros has adapted its Sno-Flyr rotary snowplow to D7-tractor mounting.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 402.

New Water Purifier For Use on the Job

An automatic electrically operated ultraviolet water sterilizer can solve the problem of drinking water obtained from a well, spring, or other unprotected source, reports Sepco Corp., Pottstown, Pa. The company points out that its sterilizer requires no attention, uses no chemicals, and adds no taste or odor to the water. The purifying is done by ultraviolet radiation according to a principle frequently employed for atmospheric purification in laboratories, hospitals, and other places where the air should be free of germs. The company reports that extensive laboratory tests and field service have proved that the Sepco sterilizer makes badly contaminated water safe to drink.

Basically the sterilizer consists of a stainless-steel tank 72 inches high x 12 inches in diameter. Inside, four specially constructed ultraviolet ray tubes extend vertically through the water. Patented baffles at various levels guide incoming water close to the tubes.

The sterilizer purifies water at the rate of 400 gallons an hour. Where a larger supply of water is needed, two or more sterilizers can be used. They are installed by being plugged into incoming-water lines ahead of any taps, then plugged into standard electrical outlets.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 512.

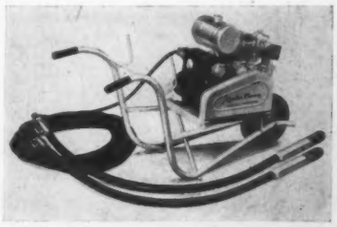
Vibrator Power Unit

A new lightweight portable power unit for vibrators and lighting systems has been announced by Master Vibrator Co., 100 Davis Ave., Dayton 1, Ohio. The complete unit weighs 172 pounds and may be moved around on its wheelbarrow carriage. All power connections are watertight and fuses are easily replaced.

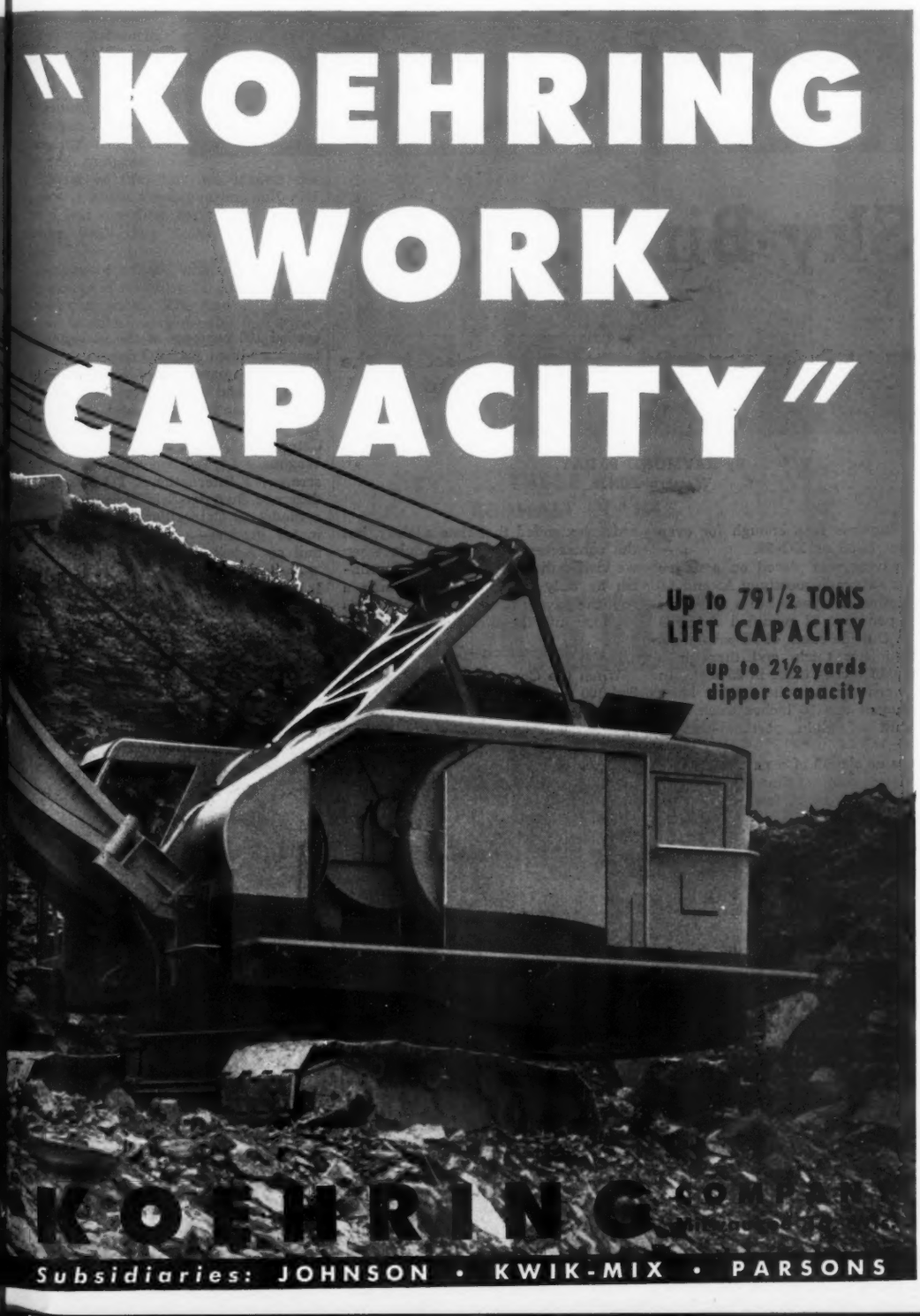
The Master Champ Hycycle vibrator provides 10,300 vibrations per minute without excessive heating under normal load, and vibration can be provided to any point within 300 feet of the unit. There are two single-phase outlets for 1,200 watts of lighting; if only one of the two vibrator cables is used, the Master Champ will provide 600 watts of light at the same time.

The new unit is powered by a Wisconsin single-cylinder air-cooled 4.4-hp gasoline engine at 3,200 rpm. Conductor cables are furnished in 50, 100, or 150-foot lengths, with watertight connectors. Operating vibrator cables are available in 5, 10, or 21-foot lengths.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 408.



This is the Master Champ Hycycle vibrator power plant. It will power lighting systems too.



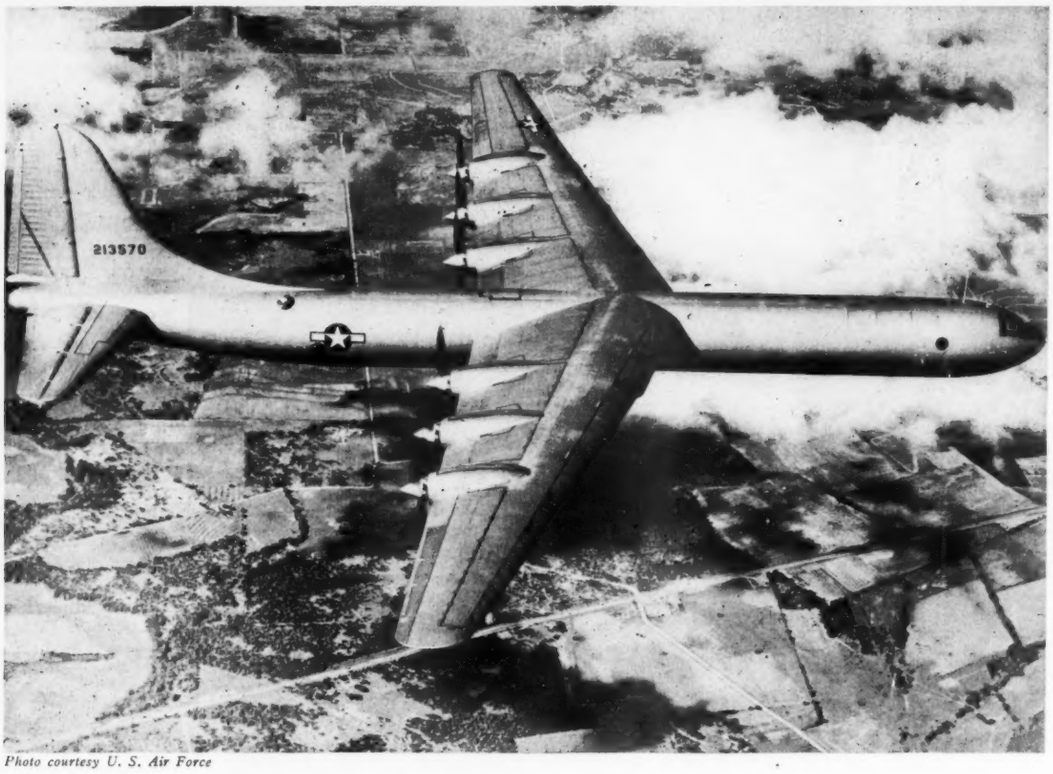


Photo courtesy U. S. Air Force

Sky-Bird Roost

Contractor Pushes Heavy Concrete-Paving Project for the Original Atom-Bomb Wing of the U. S. Air Force

By RAYMOND P. DAY,
Western Editor

• ON the high New Mexico plains west of Roswell, pudgy concrete pavers have been working long hours so sleek giants of the U. S. Air Force can operate with maximum effect. The main runway has been getting an adjacent plane-parking apron 125 feet wide; and a huge 300 x 1,500-foot dock maintenance apron, where the big planes can get a bath and other attention, has been built. Mex-Tex Constructors had the $1,900,000 contract with the Corps of Engineers.

Walker Air Force Base, where the work was done, is the home base of the 47th Air Division, including the 6th Bomb Wing and the 509th Bomb Wing. The 509th is the original atom-bomb outfit. One of its planes, the Enola Gay, carried the Hiroshima bomb. A few members of the Enola's original crew are still at Walker.

But the paved areas which have been under construction will take bigger planes than the Enola Gay. She was a B-29. The present paving is designed for a 100,000-pound wheel load, which means runways firm enough for even the giant B-36 or XC-99.

The paving was placed on a native granular subgrade, mostly of A5 and A6 classification, compacted to a minimum of 100 per cent of modified AASHO density. Outside edges of all pavements are 21 inches thick, and there is a taper to 16 inches thick in 25 feet. In other words, all but the outside lanes of pavement are 16 inches thick, and are built of plain portland-cement concrete.

It was no slouch of a paving project. The original contract time was 120 days from February 14. A few extra work orders extended that time slightly, but the contractor was on schedule when we visited the job and expected to finish by July 10. Working 16 hours a day, the pavers poured 100 cubic yards an hour into the thick slabs.

Compaction—Terrific!

When the Corps of Engineers specified 100 per cent densities, some of the engineers of that organization doubted whether that result could be maintained, or even attained the first time. Not only was an unusually tough compaction assignment handled successfully, but in some cases the tests exceeded 100 per cent of the notoriously tough modified AASHO density.

Since the paved areas lie adjacent to runways and other improved areas, grading quantities were light. For grading equipment, Mex-Tex selected 3 Caterpillar DW10's, 2 M-R-S Mississippi Wagons, a LaPlant-Choate motor scraper, 2 International TD-24's with dozers, 2 Bucyrus-Erie B-250 scrapers, a Model 80 Caterpillar scraper, and 2 motor graders—a Caterpillar No. 12 and an Adams 610.

The soil was a silty, clayey material. It was not hard to dig, but when the grade was established, compaction was a different story. Specifications called for the upper 6 inches to be given the special 100 per cent treatment.

Only one method worked. The upper 3 inches was laid aside by a motor grader, and the lower 3 inches was then thoroughly scarified with the motor-grader teeth. At the same time, two 3,300-gallon GMC-mounted water tank trucks hauled load after load of water

(Continued on next page)

C. & E. M. Photo

The new paving at Walker Air Force Base west of Roswell, N. Mex., is designed for giant planes like the B-36 above or the XC-99. Here a MultiFoote 34-E paver—one of two on the job—dumps a bucketload in front of the header to end a day's pour.

C. & E. M. Photo

Workmen pause momentarily as a Blaw-Knox finisher moves up the slab. Mex-Tex Constructors' $1,900,000 contract also included a plane-parking apron adjacent to the main runway and a 300 x 1,500-foot dock maintenance apron.

Photo courtesy U. S. Air Force

Walker Air Force is under the command of Brig. Gen. Hunter Harris, Jr., Commanding General of the 47th Air Division.

to the area, and sprinkled it on the earth.

"We made a regular lake, we used so much water", explained C. W. "Red" Ashworth, excavation boss. "When we'd worked it up to a goo, we put two small sheepsfoot rollers and one great big sheepsfoot to work. I let them roll until the ground got sticky. When it began to pick up on the sheepsfoot tamping feet, then I brought in my loaded scrapers.

"Most of the time we loaded the scrapers about three-quarters full, and we'd just run them back and forth for hours, until they walked out of the base."

Strangely enough, what seemed to be an excess of moisture turned out to be the exact trick. The fine soil rolled down to such heavy density that it resembled cement-stabilized material more than anything else. Excess moisture was apparently absorbed quickly by the dry ground underneath. When surveyors staked the final hubs in this compacted grade, they had to use moil points and a pneumatic hammer to get a hole punched through the hard material.

The grade was set up to very close tolerance, and when the equipment left an area, it was ready within very minor limits for the concrete paving. A few low places were filled with sand after the forms were set, but in most places ½ inch of sand was plenty.

Heavy Steel Forms

Forms consisted of heavy Blaw-Knox steel sections, with 16-inch sides and 16-inch bases. The 10-foot sections were heavy, and it took a gang of about 20 men to handle the setting and tamping. No form trench was necessary, since the grade had been shaped to close tolerance by the grading crew. Surveyors simply set blue-tops for line and grade, and the form setters placed the sections according to a string line referenced in from these hubs.

Form sections were heavy enough so that it was impossible for men to load them to move them ahead. A small truck-mounted crane was used.

When the forms were set, the grade was again checked at several points, using a string line. Minor adjustments were made by a No. 12 Caterpillar motor grader, and rarely did the grade show enough excess material to be troublesome. If it had, it would have been tough to cut it with a blade.

Two Pavers Pour

Concrete mixing and placing was done by two Multi-Foote pavers: one a dual-drum 34-E, and the other a 34-E single-drum. The pavers were usually spotted side by side on the subgrade adjacent to the strip being poured. The

(Continued on next page)

C. & E. M. Photo

This closeup shows details of a construction joint at the end of a day's paving run at Walker Air Force Base project.

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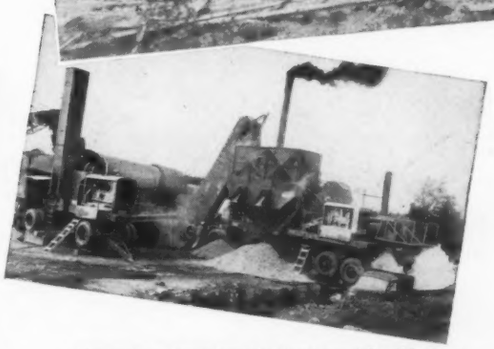

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TOPEKA, KANSAS
Write for Complete Details

A Sky-Bird Roost Built in New Mexico

(Continued from preceding page)

34-E dual-drum machine covered the far side of the pour, while the single-drum rig could reach the near side of the strip with its boom.

Batch trucks hauled five 1.33-yard batches, and dumped them one at a time to the paver skips. Mixing water came from a hydrant on the base, and the two pavers had a common storage trailer which would carry 3,000 gallons of water. They took the mixing water from this trailer as they needed it.

The paving-machine lineup, for spreading and finishing the concrete, contained this order of equipment: There was a Blaw-Knox spreader, with Jackson vibrators. A Blaw-Knox finisher put on the initial dressing. Then came a Koehring Longitudinal Finisher, whose screeding effect is opposite from the Blaw-Knox machine, to give a perfect straight-edge effect.

C. & E. M. Photo

A Caterpillar No. 12 motor grader gets its daily servicing from a Mobile service rig on the Mex-Tex Constructors' job near Roswell, N. Mex.

Following was a Flex-Plane joint machine, which installed the ⅜ x 4-inch contraction grooves every 25 feet. The longitudinal joints, by the way, consist of standard key joints, with hinge joints on the outside strips. A Cleveland bridge followed the Flex-Plane machine, and men with wood floats worked the concrete surface down to a smooth finish, even better than the Longitudinal Finisher could leave it. Men also worked from this bridge to put a preliminary dressing on the joints. The last machine in the lineup was a Flex-Plane curing machine, which sprayed Hunt Process Clear membrane cure on the green concrete.

The concrete was poured in a systematic order which permitted the machines to keep traveling around the job. The first lane to be poured was the first inside 16-inch strip. Subsequent lanes were then placed with the pavers in the same position on the subgrade of the next lane.

Concrete Materials

Materials to make the concrete mix were produced partly at the site, and some were shipped in. Concrete aggregates, with the exception of fine sand, were produced by Mex-Tex crushing and screening equipment set up in a pit near the northeast corner of the base. Consolidated Engineering Co. of Carlsbad, N. Mex., supplied the sand. The firm is a supplier of material and not a subcontractor. Universal Atlas bulk cement was used, and it came by rail from a plant at Hannibal, Mo. Contractor officials believed a closer source of cement might be obtained before the project was finished.

The cement came in to the batching point on a railroad spur. Aggregates were trucked in, dumped in appropriate storage piles, and stacked in front of a Northwest 1½-yard clamshell by an International TD-24 dozer. Cement was unloaded by a screw conveyor under the railroad track, and then raised up into a 600-barrel Blaw-Knox cement silo, which also had weigh-batching facilities in the plant.

Aggregate batching facilities included a 3-compartment Blaw-Knox bin, which was used primarily for sand blending. A conveyor led from the bottom of this plant to one of the three hoppers of a second Blaw-Knox batcher. The sand and aggregates were weighed manually at this point, and then dumped to waiting batch trucks.

A production rate of 100 cubic yards an hour was maintained, and the output sometimes exceeded this figure. That is one of the reasons pilots saw an ever-changing scene from the air as they returned to Roswell.

Personnel

Walker Air Force Base is under command of Brig. Gen. Hunter Harris, Jr., Commanding General of the 47th Air Division. Construction work was performed under a working agreement of long standing between the U. S. Air Force and the Army Corps of Engineers. Colonel Charles H. McNutt, District Engineer, heads the Albuquerque District, and has as his Chief of Operations Frank Gruver. Cecil C. Wabashaw was Project Engineer.

T. E. Moore is Construction Manager for Mex-Tex Constructors; Leo Van Ellen directs the concrete organization; Louis A. Wilson is Project Manager.

Mex-Tex Constructors is a construction combine of four firms. They include Rock Roads Construction Co. of Chicago; Pioneer Constructors of Tucson, Ariz.; Construction Materials Co. of Tucson; and Allison & Hutchison of Roswell.

Principal subcontractors included Purdy Electric Co. of Roswell and J.

(Concluded on next page)

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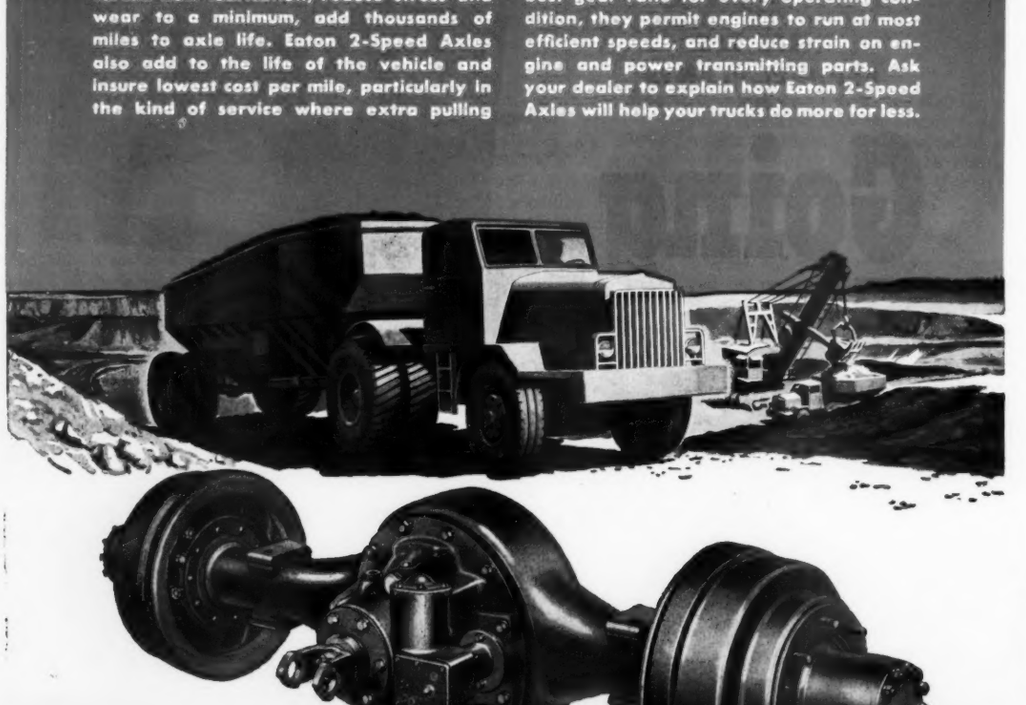

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Diggs of Albuquerque on trucking of all materials; and United Engineering Co. of Roswell did the engineering work which was the contractor's responsibility.

The improvement of Walker AFB is expected to make more room for the two bomb wings whose facilities are now terribly crowded. Moreover, the dock maintenance apron is expected to be one of the most modern at any military airfield, and the additional service which expensive military airplanes will receive there is expected to improve the operational efficiency of planes and men to an even higher degree than at present.

New Type Foundation Introduced to U. S.

Formation of the Franki Foundation Co., which will engage in engineering and installing foundations for industrial and commercial construction, and for public works, was recently announced by Arthur J. Bulger, newly elected Chairman and President of the organization.

Employing an exclusive method of construction, the displacement caissons in which the new company will specialize are installed "from the bottom up". In describing the method of installation, Mr. Bulger said that a plug of concrete placed at the bottom of a steel casing is driven into the ground by blows from a solid ram weighing from 2 to 4 tons. When the desired bearing soil stratum or rock is reached, small quantities of concrete are successively driven out of the casing by the ram to form an enlarged base. As the casing is removed, the shaft is solidly rammed with dry concrete. This method, Mr. Bulger said, while never used in the United States heretofore, was developed abroad more than 40 years ago, and has been employed successfully in most other countries in the world.

One of the chief features of the displacement caissons is that the concrete is solidly rammed into the soil, connecting it in the vicinity of the caisson before the load is applied. The typical caisson, Mr. Bulger said, is capable of bearing a 100-ton load. They can be installed to a depth of 120 feet when necessary, and may be reinforced.

Members of the Board of Directors of Franki Foundation Co. are, in addition to Mr. Bulger, Joseph Becker, E. A. Berry, George M. Carvlin, Leon A. Fraikin, Edgar Frankignoul, and Alfred Putzeys. Officers of the new company, which has established general headquarters at 436 Seventh Ave., Pittsburgh, are: George M. Carvlin and Leon A. Fraikin, Vice Presidents; John M. Crimmins, Secretary; E. B. Shuck, Treasurer; T. H. Hamilton and B. A. Horn, Jr., Assistant Secretaries; and R. E. Gray and J. M. Veeder, Assistant Treasurers.

New Safety Service

A 4-page safety pamphlet for distribution to workers is offered by Frank O. Shoemaker, 3641 S. Iron St., Chicago 9, Ill. It is issued once a month and copies are sent to subscribers with their company name printed on the first page.

"Your Safety News" is prepared for 25 diversified industries and is written in a simple easy-to-understand style. It includes illustrations, stories, cartoons, and slogans designed to make the employee safety-conscious.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 481.

Chain Belt Sales-Staff News

The Chain Belt Co., Milwaukee, Wis., has named five new district sales engineers. Edward D. Williams has been assigned to the Philadelphia District Sales Office. Truman J. Hammel is working out of the Kansas City Office. R. W. DeMott, Jr., has his headquarters in the New York District Sales Office, and Kenneth Burch is with the Cleveland District Sales Office. George Robichaud has been assigned to the Boston District Sales Office.

A ¾-Yard Excavator

A 20-page catalog has been released which illustrates the basic construction and operational features of the ¾-yard crawler-mounted excavator made by Bay City Shovels, Inc., Bay City, Mich. The excavator is completely convertible to crane, bucket, shovel, dragline, or backhoe operations. Separate sections of the booklet describe the crawlers and the lower base, the machine assembly, and the applications of the unit. Closeups illustrate each of the working parts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 485.

The "FITZ" CONCRETE HANDLING BUCKET

At last, a bucket designed to pour concrete against the side of a wall — side bottom opening. 1/3, 2/3 and 1-yard capacities — opening can be operated from either side of bucket. 3' overall height from ground level. Easily loaded from any truck mixer — Bucket always vertical regardless of load. Immediate Delivery — $165.00 for 1/3 yard bucket delivered.

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SCREEDING The slow, back-breaking labor of hand-screeding is eliminated with the Whiteman Screeding Machine. In far less time, this efficient machine screeds the slab to a perfect level, puddles and vibrates the concrete throughout the entire depth and area, thoroughly compacts the slab and brings the moisture to the surface preparatory to floating or finishing operations. Screeds widths from 3'-20' and slumps from 1". Powered by gasoline engine. Available in two sizes. Built for years of rough use.

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FLOATING-FINISHING Complete your efficient concrete operation with the Whiteman Floating-Finishing Machine. Does the work of five men with hand trowels. The Whiteman exclusive, patented "snap-on" float trowels are attached in a few seconds to compact the slab, drive out air pockets, bring up moisture and produce an excellent traction surface. For finishing, remove float trowels and use the tool-steel finish trowels. Pitch of trowels is adjusted by control knob on handle while in operation...an exclusive patented Whiteman feature that is a terrific time saver.

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New Crawler Tractor

A new crawler tractor called the GT-30 Terratrac has been introduced by the American Tractor Corp., Churubusco, Ind. Powered by a 4-cylinder Continental F-140 engine, it is designed for many construction uses.

Fully equipped with hydraulically activated bulldozer and angle blade, the GT-30 weighs under 4,400 pounds. Special rubber track shoes have been developed to increase its uses for indoor operations on concrete or wood floors, or on highways. Interchangeable gage widths ranging from 42 to 72 inches, the use of five lower track rollers, and high ground clearance are designed to give the Terratrac stability in hilly, sandy, or muddy terrain.

In addition to the bulldozer and the angle blade, the tractor can be fitted with a hydraulically operated bucket loader, winch, or scoop. A 3-point hydraulic-lift system for rear-mounted tools is an added feature. Wide arm rests, upholstered seat, conveniently located controls, full visibility from all sides, and well-guarded leg space are designed for the operator's comfort.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 479.

The new GT-30 Terratrac performs in a recent mud test at Ottawa, Ontario.

Winch Manual and Guide

Emphasizing the importance of equipment care and maintenance in the national mobilization program, Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg., has issued a 12-page operator's guide and general information for the Hyster D7N towing winch designed exclusively for the Caterpillar D7 diesel tractor.

The winch manual shows the operator how to obtain maximum performance and full utility of the winch. It describes its mechanical components, fundamental and advanced operating instruction, and typical winch operations and rigging methods. It also contains a summary of efficiency reminders, and a glossary of winching terms. Fully illustrated with photos and drawings, the manual takes the operator from his initial instruction through various problems encountered on the job.

This literature may be obtained from the company by requesting Form No. 1184, or by using the Request Card at page 16. Circle No. 500.

Skilsaw Buys Blade Co.

Skilsaw, Inc., Chicago, Ill., manufacturer of portable power tools, has purchased the controlling interest in Loud-Wendel, Inc., a Middleport, N. Y., company which makes circular wood saws, dado sets, and industrial knives.

Loud-Wendel, Inc., was organized in 1946 by Glen F. Loud and H. Schoelles Wendel. Mr. Wendel remains with the company as Vice President and General Manager. Bolton Sullivan, President of Skilsaw, replaces Mr. Loud, who has retired as President. George E. Brennan has replaced A. Thorne Hills as Treasurer. Kermit Du Moulin is General Sales Manager.

Heavy-Duty Trucks

The part which heavy-duty trucks and highway tractors play in construction is described with pictures and text in a new 6-page folder issued by The Autocar Co., Ardmore, Pa. It points out that heavy-duty Autocars perform specialized tasks in all construction operations—from the forest and the quarry to the building site. It cites the features of complete heavy-duty trucking equipment in such punishing operations as hauling stone, ready-mixed concrete, brick, steel, lumber, and machinery. Entitled "Autocars Keep Building Material on the Move," it pictures Autocars engaged in 14 different operations.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 444.

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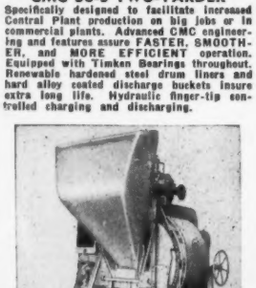

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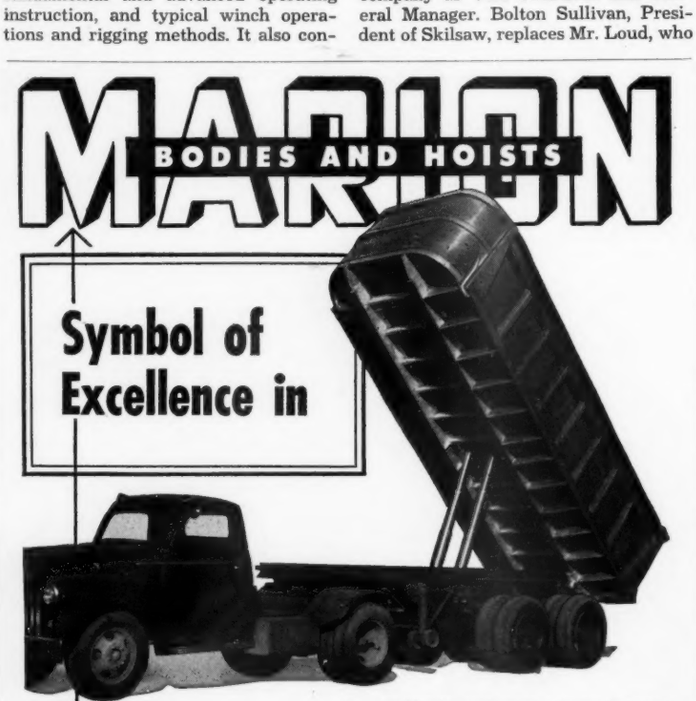

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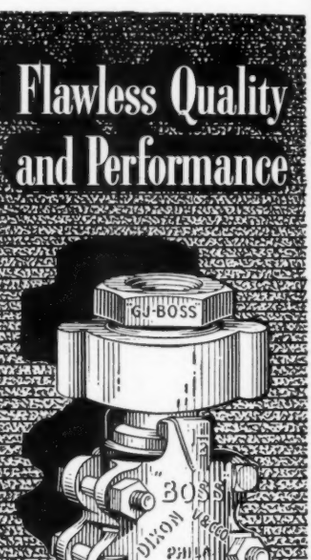

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Asphaltic Road Test Urged at WASHO Meet

Bituminous Research Will Complement PCC Road Test Held In Maryland; Other Highway Issues Discussed

• CONSTRUCTION of a bituminous test road to furnish additional loading data may get under way somewhere in the west during the 1951 construction season.

The action was adopted by resolution as 475 delegates of the Western Association of State Highway Officials met in San Francisco's Fairmont Hotel June 24-28 to discuss important highway problems.

The bituminous test is being designed to furnish data for asphalt pavements comparable to those developed for rigid -type slabs in the recently finished Maryland road test. Of the 11 western states and Texas, 10 states voted in favor of participating in the proposed program, which was tentatively slated by a study subcommittee for construction somewhere in the general central area of southeastern Idaho, southwestern Wyoming, or northwestern Utah.

If construction of the test road follows tentative plans, actual work is expected to begin sometime before September 1. If possible, the engineers expressed a desire to get all or a great part of the construction work finished this fall, so testing could begin early in the spring of 1952 to cover a part of the spring frost-breakup period.

The road is expected to be built from scratch, and may or may not form a part of the highway system of the state in which it is built. If rehabilitation work is necessary to restore the road to satisfactory condition after the test is concluded, it will be the responsibility of the state in which the highway will be located.

The test section will be at least 7,200 feet long, and preliminary estimates of its construction cost are $275,000. Of this amount, about $95,000 is already subscribed from sources outside the western states, and the contribution of each participating state will be about $20,000.

Final design of the test section will be left up to the WASHO design committee. It is expected that some of the section will be constructed to 18,000-pound axle standards, with some above and some below that classification. All possible types of western bituminous pavements are to be simulated in the test, which will include loadings up to 44,000-pound tandems.

Solidarity Needed: MacDonald

Never before has solidarity between the several states and the Bureau of Public Roads been so necessary, according to Thomas H. MacDonald, who spoke to the meeting delegates on the opening day of the sessions. Highway departments must stand together, MacDonald warned, and examine every proposal which would threaten the highway plant.

Tracing the parallel which he said exists between highway traffic miles and national productivity, the BPR chief refuted the idea of highway works as a public-works venture to be undertaken only in times of slack employment. Highways mean high employment, MacDonald said, as he produced statistics to show how the nation's road network contributes to the general employment pattern.

MacDonald complimented western states on their use of longer load limits to distribute the ever-increasing gross load weights, and he stated that "some eastern states have load limits their highways cannot stand". But in east and west alike, he warned, highway replacement per year is almost static while truck traffic has stepped up 76 per cent since 1940. The national average replacement life for all major roads is a 31-year cycle, MacDonald warned, and he said this is so much greater than the actual reasonable life of a highway that the nation's highway engineers are "dangerously close" to "losing the battle".

R. H. Baldock, Chief Engineer of the Oregon State Highway Department, summed up important highway policy pronouncements made in 1951. One of the most significant statements about the over-all highway situation made in recent months, Baldock said, was a speech by New Mexico Senator Dennis Chavez made March 12 before the ARBA in Milwaukee, Wis., in which Chavez had called it the height of folly to allow the highway system to deteriorate.

Other policy pronouncements which were important according to Baldock's view included a recent letter to Charles E. Wilson from the National Highway Users Conference, saying that the whole highway system needed rebuilding. Col. E. R. Needles of ARBA was also quoted by Baldock as saying that the deterioriation of highways was so

(Continued on next page)

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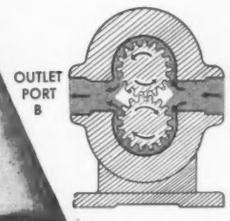

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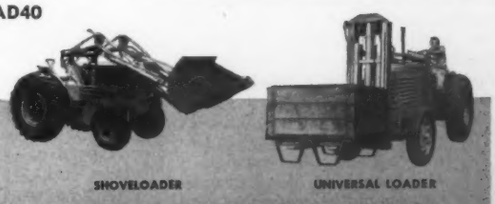

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Asphaltic Road Test Urged at WASHO Meet

(Continued from preceding page)

bad that maintenance money was being poured down a rathole. Recent suggestions which he said were made by James K. Knudson to use AASHO loading standards for minimums were rejected and ridiculed by the Oregon highway head.

Governor in Safety Plea

In a major speech before the WASHO, Governor Earl Warren of California made a plea for safety designs of some kind which would stop the highway slaughter. Warren noted that there were 73 per cent less accidents on limited-access freeways than there were on ordinary 2-lane highways. That, he said, may be an indication of what future designs may bring.

The California Governor told how the Burns-Collier program had resulted in the construction of $380,000,000 worth of highways since 1947, and he said that 3,722 new miles had been constructed in that period. Work worth $130,000,000 is budgeted for the coming fiscal year, he said.

Nick Carter of the national Institute of Traffic Engineers took the WASHO meeting as an occasion to present Governor Warren with a bronze plaque commemorating California's contribution to highway and traffic engineering. California, Carter said, has now been classified among the 8 heaviest-populated states, and the traffic-engineers award for first place in highway pioneering made by Carter represented California's competition with states in the new classification. Warren promptly disclaimed responsibility for what progress the State had made, and passed the award to Charles H. Purcell, head of the Division of Public Works.

AGC Representative Speaks

A. N. Carter, Co-Secretary of the Associated General Contractors of America, told in some detail the current confusion in construction circles resulting from the M-4 order of May 3 by NPA. He also attacked NPA's slowness in issuing delegation 14, and said that the confusion was further accelerated when NPA failed to announce promptly what controlled materials were still available from the third quarter or to indicate what was available for the fourth quarter of 1951. The promptness of the Bureau of Public Roads in determining the essentiality of allocations has been one of the few bright spots in the controls picture, Carter said.

As to contractor-state relations, Carter pointed out that a rise of only 2.6 points in the BPR index in the first quarter of 1951 meant that low prices still prevail despite the confusion in the industry. Excavation prices rose only 1.3 per cent in that period, while paving went up only one half of a percentage point. Structure prices rose 9.7 per cent during that period, Carter said, as he blamed the steel situation for the rise.

Later, in a discussion of the talk, California's R. H. Wilson refuted Carter's information by showing that of 8 work items in California's price classification, steel was the only one which dropped during the first quarter of the year.

Carter called for termination clauses to protect the state and the contractor in case of war emergencies or other uncertainties, but he said the AGC does not want escalator clauses in its contracts. Carter also repeated previously made public statements that the AGC favors long-range highway planning, a stronger state public-relations program, and a speedup of construction. The latter could be accomplished, according to Carter, by giving contractors free use of the selection of equipment, so the most economical procedures could be developed. Work would be accelerated also, Carter said, if states would make sure the right-of-way was purchased and all loose ends tied up, so that contractors could move in and start work as soon as a contract was awarded. Programs should be awarded in various-size contracts to attract all sizes of contractors, and if possible the construction season should be drawn out as far as possible by awarding work in early winter for the following year. Contractors should be paid promptly, retained percentages should be lowered, and work should be standardized so equipment of the same type could be used in neighboring areas, according to Carter.

Contract Penalties Told

It may be necessary to apply contract penalty clauses more stringently, said W. A. Bugge, Director of Highways for the State of Washington, as he told how $11,020 in engineering

(Concluded on next page)

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The PIPPIN EXCAVATOR — a combination digger and loader attachment for Ford and Ferguson tractors —

- Back hoes, front hoes, shovels and loads
- Converts from back to front hoe in five minutes
- Digs 7′ deep. Back hoe buckets available from 15" wide to 37" wide.
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costs had been collected from 7 contractors last year.

The contractor is just as necessary in the construction relationship as the engineer, Bugge said, but while overruns of time are decreasing, those which remain are especially irritating and unnecessary if the jobs are considered in the light of public necessity. Bugge said his two pet peeves were (1) the lazy contractor whose indolence causes valuable time to be lost in the early months of a job and (2) the big, well equipped contractor who deliberately takes on more work than he can do on the strict business-gamble basis that full-time work for his crews and equipment will more than offset penalties he might have to pay.

Bugge urged that some system of workable days be used as a basis in determining penalities, and told how Washington plans each week to have a report of workable days submitted in writing and signed jointly by the resident engineer and the contractor's superintendent. Experience ratings have also been started on each contractor doing state work, and these ratings may be used in the future as a basis for future awards.

Bugge impartially presented the contractor's side of the picture as well, and told how some young engineers without experience went "only by the book", while older resident engineers were too lenient the other way. He told how one engineer applied the penalty clause because a contractor failed to start construction work 10 days after the contract was awarded. A subsequent investigation showed that the job was in a remote location, that the notice of award had been sent out by regular mail, and that because of the state's shortcomings it was a physical impossibility for that contractor to get going.

Judgment must be applied by district engineers especially, Bugge said, with as much wisdom and justice as if the contractor had asserted his legal rights in court. And the engineer should never prejudge a contractor simply because the firm is small. Bugge told how in 1919 a small firm called Morrison & Knudsen overran its time limit on its first job because too few horses and fresnoes had been assigned to a 30,000-yard job. That firm is now the world-noted Morrison-Knudsen Co., Inc., and it has a consistent habit today of beating its time schedules with resultant benefit to the public, Bugge said.

Resolutions Offered

Among the resolutions offered was one which unanimously backs the immediate construction of the test highway. The WASHO by resolution also commended NPA for its "wisdom in handling highway matters". Opposition to any increase in Federal gasoline or excise taxes for motor vehicles was voiced.

The Association urged that watersheds, forests, and other natural resources be protected, and that work be undertaken soon to repair damage done in the past to these natural assets. A continuation of intensive studies to bolster AASHO's recommendations regarding a 1952 Federal Aid Highway Act was urged, and the group asked for immediate appropriation of funds to construct forest roads already authorized by Congress.

The western group also established by floor vote the adoption of a proposed annual Dr. L. I. Hewes award for outstanding contributions in seven fields of highway engineering. The $500 annual award is to be underwritten by *Western Construction* magazine, and excludes chief engineers and principal division heads as contestants. The award is designed to perpetuate the name of Dr. Laurence I. Hewes, late Chief of the Western Headquarters. BPR.

New Officers

New officers of WASHO include W. A. Bugge, Washington Director of Highways, President; Mark Watrous, Chief Engineer, Colorado Highway Department, Vice President; and E. S. Paxton, Bridge Engineer, Oregon Highway Department, Secretary-Treasurer.

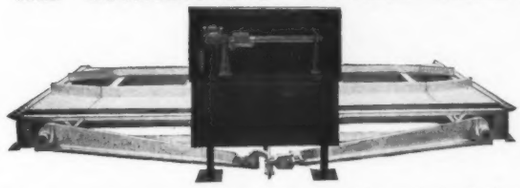
Executive Committee members include Ralph Jones of New Mexico, George T. McCoy of California, and J. R. Bromley of Wyoming.

Care of Chain Drives

A new bulletin entitled "Installation, Operation, and Maintenance of Chain Drives and Conveyors" has been issued by the Chain Belt Co., 1666 W. Bruce St., Milwaukee 4, Wis. Prepared for the men who design, install, maintain, or operate chain drives and conveyors, this bulletin shows how to get maximum service from sprocket chains. It emphasizes the need for periodic inspection, lubrication, and adjustment, and explains the best means of accomplishing this end. Illustrations show graphically correct and incorrect ways of solving chain installation, operation, and maintenance problems.

This literature may be obtained from the company by requesting Bulletin No. 51-7, or by using the Request Card at page 16. Circle No. 445.

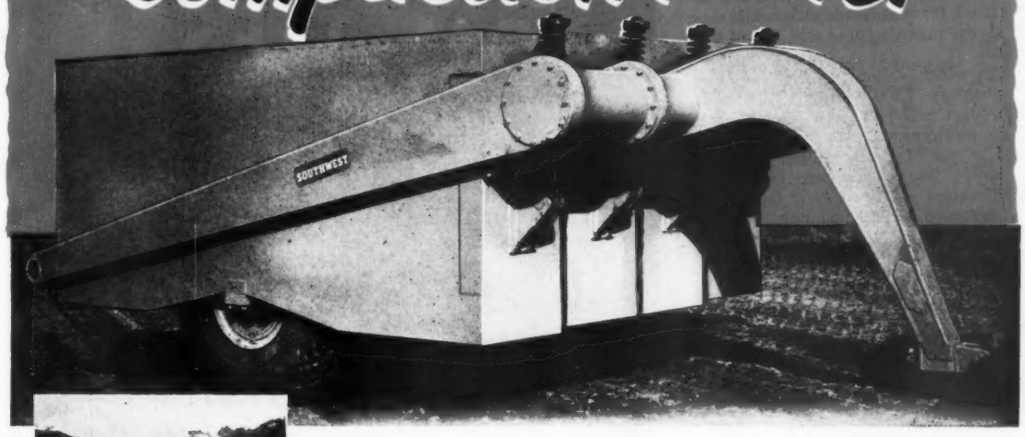
WINSLOW—PORTABLE TRUCK SCALE
"THE CONTRACTORS' SPECIAL SCALE"

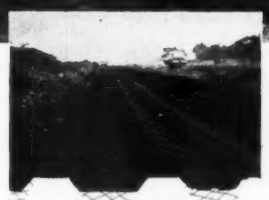


For use at temporary and permanent locations—at stock piles and by bituminous material contractors at the job site.
Capacities: 15-18-20-30 Ton—Write us for your nearest distributor

Mfd. by: WINSLOW SCALE COMPANY
P. O. Box 1198 Terre Haute, Indiana

SOUTHWEST Compaction Roller





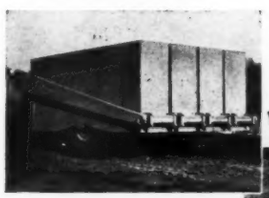
Note how every print of each tire tread is uniform in depth and shape.

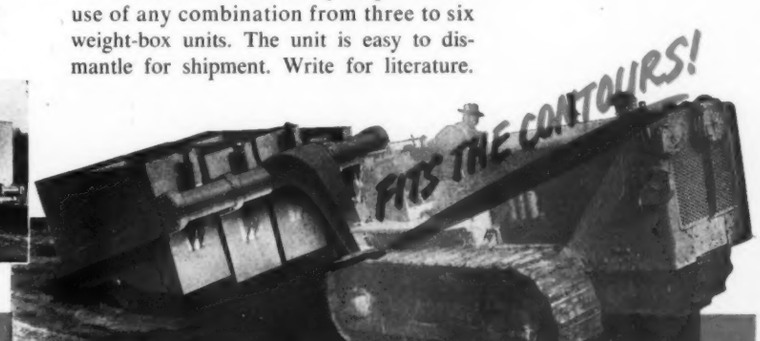
The weight-box units are hinged at the rear and oscillate independently.

For compacting earth fills!

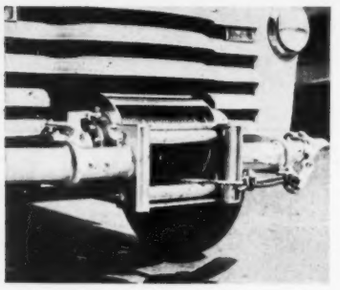
UNEVEN GROUND CONTOURS cannot reduce the efficiency of the new Southwest Compaction Roller. As it travels over the variable surface of the earth fill each weight-box unit with its own wheel and tire oscillates independently up and down. Compaction is positively uniform because the weight on each tire remains constant—there is no bridging and no sudden shifting of load from tire to tire.

The sectionalized tubular yoke permits the use of any combination from three to six weight-box units. The unit is easy to dismantle for shipment. Write for literature.





CONSTRUCTION MACHINERY DIVISION
Southwest Welding & Manufacturing Co.
Alhambra, California
HAULING SCOOPS BULLDOZERS LOADERS BOTTOM DUMP WAGONS RIPPERS TAMPERS SCRAPERS TREE DOZERS



The Koenig front-end winch can be used for light hoisting work as well as for pulling.

Front-End Winches

Winch assemblies for front-end mounting on Ford and Chevrolet trucks and on the Willys 4-wheel-drive Jeep and station wagon are manufactured by Koenig Iron Works, 2214 Washington Ave., Houston 10, Texas. Though able to do light hoisting work, these units are designed primarily for pulling, and the company has not added the expense of an automatic safety brake on the winch worm shaft.

The winch assemblies are used for pulling a truck or pickup over rugged or muddy terrain encountered in off-the-road equipment use. Koenig points out that the winches are easy to install. With a few exceptions, it says, no cutting or bending is necessary for drive-shaft clearance. Each assembly is built on an exact replica of the front end of the truck for which it is ordered. If desired, the manufacturer will install the winch.

King winches should be limited to approximately 1,500-pound dead-weight lifts—past this point the pitch of the worm and gear will not safely lock the load in case of power failure. By using a double line and sheave block, the dead-weight safety hoisting factor can be increased to 3,000 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 548.

New Rotary-Gear Pump

Two sturdy spur gears rotating inside a precision-bored housing are said to provide efficient fuel displacement in the Constant-Flo rotary-gear pump manufactured by John S. Barnes Corp., 127 Walnut St., Rockford, Ill.

This pump can be used for all liquids having lubricating qualities. Barnes reports that it makes an excellent fuel pump for industrial oil burners. It can be used in a torque converter, as a lubricating booster pump for oil lines, as a gasoline-dispensing pump, and for oil pressure systems on all types of internal-combustion engines. The standard pump is designed to operate at a continuous pressure of 500 psi and at intermittent pressures up to 750 psi.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 489.

White Returns to Army

Major W. McKean White, Jr., Vice President of the White Mfg. Co., Elkhart, Ind., has been recalled to Army duty.

Major White is now serving as Chief of Procurement Inspection at the Air Force Central Procurement Headquarters in Detroit, Mich. He will be in charge of the inspection of Air Force Procurement activities covering a five-state area.

Major White spent 2½ years in Europe during World War II. On his return he resumed his position as Vice President of the White Mfg. Co., and has taken leave of absence for 21 months on his recall to the Air Force.

W. McKean White, Sr., will handle his son's work with the company in the interim, directing production of White asphalt plants, concrete vibrators, railway switch heaters, railway side bearings, bituminous heating kettles, and other products.

Heavy-Duty Motor Graders

A 24-page catalog presenting two heavy-duty motor graders has been announced by the Tractor Division, Allis-Chalmers Mfg. Co., Box 512, Milwaukee 1, Wis. The AD-3 grader is powered by a 78-hp diesel engine. The AD-4, largest of the five models, is powered by a 104-hp diesel engine.

Applications cited in the catalog include maintenance, scarifying, snow plowing, ditching, bank cutting, and oil mixing. Cutaway photos show construction of the power supply, transmission, and final drive of the graders. The catalog points out that the Roll-Away moldboard mounting prevents blade warpage and handles capacity loads with less power by rolling the dirt instead of pushing it.

Features highlighted in the catalog are tandem drive and balance, convenient controls, full revolving circle, heavy-duty blade, strong ball and socket drawbar, enclosed wheel lean, and smooth front hubs. Attachments for the graders are a canopy top, closed cab, adjustable seat, V-type scarifier, odometer, V-type snowplow, heater, lights, and other accessories. Complete specifications are given for both graders.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 466.

HAULING can be a ONE MAN JOB!

if you use a fast loading
MILLER *Tilt-Top*

Heavy machines are easily driven or winched onto the tilted platform by one man . . . saving valuable man hours and providing extra portability for your equipment. Although low in cost MILLER Tilt-Tops are carefully engineered and ruggedly built. Standard platform is 14′ by 8′, optional 16′ available. Platform, tires, Timken bearings, pintle eye and dual Budd wheels are all standard equipment.

MODEL "B" 10 TON $1175
The following equipment is optional and extra. Hydraulic tilt control, two-speed winch, electric brakes. IMMEDIATE DELIVERY.

MILLER RESEARCH ENGINEERS
DEPT. C-8, 729 W. BURNHAM ST. MILWAUKEE 4, WIS.

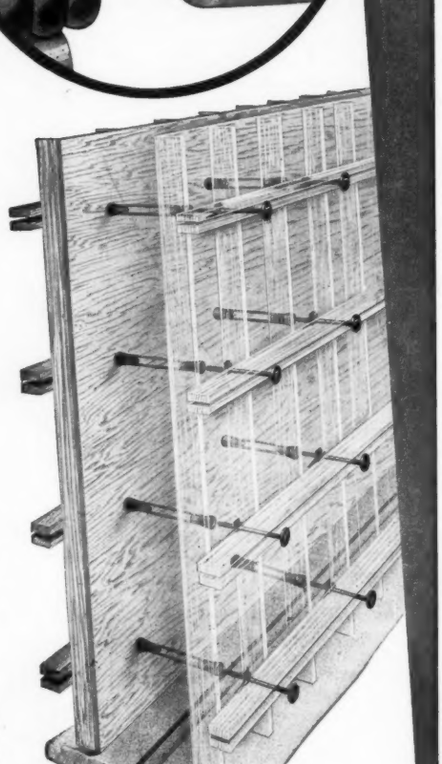
SUPERIOR *Cone-Fast* COIL TIES

YOU CAN CUT YOUR FORM COSTS!

Because the cost of form work is a prime factor in the total cost of bridge piers and abutments, retaining walls, filtration and sewage disposal plants, and other engineering projects, it is obvious that the forming phase offers the greatest opportunity to save material and reduce labor costs.

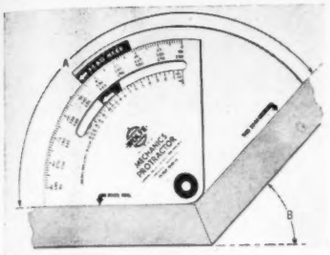
The use of Superior Cone-Fast Coil Ties is one direct means of cutting costs and here's why: The *exclusive* feature of this tie is the extension of the coil beyond the ends of the wire struts (enlarged detail above) which allows a reamed Coil Cone to be fitted snugly in place before the opposing panel is erected. No separate gadgets are required. Cone-Fast ties are practically a "must" when large panels are used on walls where the workman cannot get inside the forms. Cone pointed Coil Bolts are easy to engage because of the large square openings in the cones. Bolt Holders (shown on panel form) keep bolts and washer on panel when stripping and moving for reuse.

Cone-Fast Coil Ties are available for Coil Bolts ½" to 1¼" in diameter and can be used with all types of forms. All working parts are returnable. For maximum efficiency plan your form work with SUPERIOR Cone-Fast Coil Ties.



REQUEST a copy of our 56-page catalog. It contains a valuable table for spacing studs, wales, and form ties.

SUPERIOR CONCRETE ACCESSORIES, INC.
4110 Wrightwood Avenue, Chicago 39, Illinois
New York Office: 1775 Broadway, New York 19, N. Y.
Pacific Coast Plant: 2100 Williams St., San Leandro, Calif.



This new protractor is designed for the man on the job.

Three-Way Protractor

A new "mechanic's protractor" for on-the-job angle measuring up to 180 degrees is made by Interstate Sales Co., 123 E. 18th St., New York 3, N. Y. Three readings are obtained at one setting: outside angles, inside angles, and inches-per-foot against degrees—the last for angles up to 63 degrees. Calibrations are at the extreme of the radius, enabling accurate readings to a fraction of a degree.

The protractor is pocket size and light in weight. Constructed of Vinylite plastic, it is not affected by grease or water, and will not burn, warp, or become illegible, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 431.

For Speed Reduction

By using standard speed reducers as primaries and secondaries, a line of double-reduction units comprising over 86,000 combinations as to capacity, model, and ratio has been made available by the Cone-Drive Gears Division of Michigan Tool Co., 7171 E. McNichols Road, Detroit 12, Mich. The combination provides models with input ratings of from 1/10 to 68 hp, output torque from 4,000 to 244,000 inch-pounds, and reduction ratios of from 25 to 1, to 4,900 to 1. Although the line provides some 86,000 possible combinations, there are actually only 5 sizes of primary reducers and 8 sizes of secondaries.

Feature of this setup is that it enables a low-cost combination of standard units to meet all kinds of operating conditions. Thus standard ratios for primary and secondary reducers can be combined in a number of ways according to operating requirements to give the same over-all ratio. Similarly, the size of the primary or secondary reducer can be varied to suit operating conditions.

The only major difference between the standard reducers used in the double-reduction units and those supplied for single-reduction purposes is that primary gear shafts and secondary pinion shafts are slightly shorter. An adapter plate and flexible coupling connects the two reducers. A special housing is also used for the smallest of the primary reducers. Otherwise, all parts are standard and are carried in stock at Cone-Drive Gears Division.

Individual primary and secondary reducers are interchangeable and separately replaceable within given size ranges and may be dismounted and quickly converted to single-reduction units if desired, since each component retains its independent lubricant supply and breather. Use of standard gear sets also makes it simple to change the ratio of any combination where and if desired, since all gear sets and bearing mountings are interchangeable for all models of the same size; this facilitates maintenance replacement.

Other features of the reducers include high-speed metallic oil seals where the seal is immersed in oil; provision for water cooling if required in the secondary unit of small double-reduction reducers and in both primary and secondary units of the larger sizes; antifriction bearings throughout; and use of chill-cast copper-nickel-tin-bronze gears and high-carbon chrome-molybdenum-nickel-steel heat-treated pinions.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 498.

Rubber-Tired Cranes

The 8 different models of rubber-tired cranes made by Coles Cranes, Inc., 4312 S. Paulina St., Chicago 9, Ill., are described in a broadside. These units are manufactured in capacities ranging from 1¾ to 23 tons. All models are built as either self-propelled, truck-mounted, or rail-mounted units, with either strut or cantilever-type booms. The literature shows Coles cranes doing various jobs and tabulates their dimensions, specifications, and lifting capacities. Additional data are given on their construction and operating features.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 494.

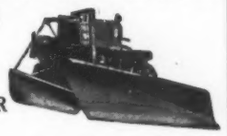
USCSC Appoints Wagner

Allen Wagner, Director of Public Relations of the American Road Builders' Association since March 21, 1949, was recently appointed Assistant to the Chairman of the Civil Service Commission, Robert Ramspeck.

For four years prior to heading up the public relations activities of the ARBA, Mr. Wagner was public relations manager of the American Society of Civil Engineers, and executive editor of its publication, *Civil Engineering*. A native of Minneapolis, Mr. Wagner was in former years in charge of public relations activities for the Minnesota Mining & Mfg. Co., Executive Secretary of the Minneapolis-St. Paul Sanitary District, City Editor of the St. Paul *Daily News*, and member of the staffs of other newspapers.

DETERMINE NEXT WINTER'S NEEDS NOW

DAVENPORT-FRINK SNO-PLOWS for FASTER • SAFER • CLEANER SNOW REMOVAL



V-Blade Sno-Plows for all sizes and makes of motor trucks—also tractors, motor patrols and locomotives.

Straight Blade or Reversible Blade Sno-Plows are desirable for lighter snows or for cleaning one side of street or highway at a time.

DAVENPORT BESLER CORPORATION
Dept. A. Davenport, Iowa

Made in Eastern U.S.A. by FRINK SNO-PLOWS, INC., 1000 Islands, CLAYTON, N. Y.

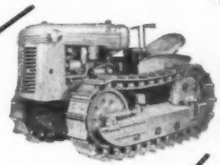
OLIVER

the "CHOICE" Line

When performance under exacting operating conditions . . . where dependability and low operating and maintenance expense are essential, the *choice* of cost-conscious operators is Oliver. Your Oliver Industrial Distributor will be happy to give you all the facts on why this complete line of job-specific wheel and crawler tractors and matched allied equipment should be *your* choice! The Oliver Corporation, Industrial Division, 19300 Euclid Ave., Cleveland 17, Ohio.

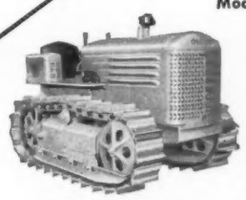
Model "88"—45 h.p. Gas or Diesel

Model "77"—39 h.p. Gas

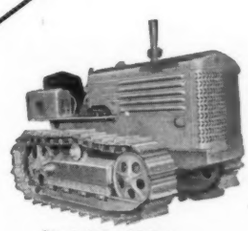


Model OC-3—22 h.p. Gas

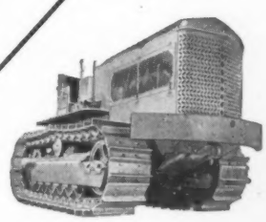
Model "66"—27 h.p. Gas



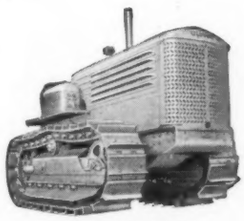
Model A—30.5 h.p. Gas or Diesel



Model B—38 h.p. Gas or Diesel



Model FDE—110 h.p. Diesel



Model D—61 h.p. Gas or Diesel

THE OLIVER CORPORATION

THE OLIVER CORPORATION

A complete line of industrial wheel and crawler tractors

Reclaims Lost Bits, Steel

The Hole-Saver, newest tool of the Rockbit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25, Pa., is described in a 4-page folder. A sectional drawing shows how this outside fishing sleeve is force-threaded in a left-hand direction onto the broken end of any of the following sizes of lost steel: ⅞-inch hexagonal or quarter octagonal, 1-inch hexagonal or quarter octagonal, 1⅛-inch or 1¼-inch round.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 510.

CARCO WINCHES SPEED BIG LAND-CLEARING JOB!

Special Carco winches "reeling in" 900 ft. of 1¼-in. cable are helping Wixson & Crowe, Inc., keep well ahead of schedule on their land-clearing project at Hungry Horse Dam, Montana. The new "highball" method—dragging a cable across the forest floor supported by an 8-ft. steel ball—has proved spectacularly successful and is attracting world-wide attention. Chalk up another victory for Western ingenuity!

1st in Volume 1st in Value!

CARCO
Winches for all makes of tractors ®

Because Carco builds more tractor winches than any other manufacturer, and for more makes of tractors, you're always close to a Carco dealer with parts, service, full data on any model.

PACIFIC CAR AND FOUNDRY COMPANY
RENTON, WASHINGTON Branches: PORTLAND, ORE. and FRANKLIN PARK, ILL.

Toll Highway to Get First Call on Steel

Tulsa Turnpike Allocation Excludes Oklahoma Highway System from Steel Share for Three Months

• UNLESS something unforeseen develops to ease the steel shortage, highway construction in Oklahoma will have to slow down.

That probability was given extra emphasis on June 4 as Oklahoma's Governor Murray said the Tulsa-Oklahoma City toll road should get first call on steel under the government's drastically reduced third-quarter allocation.

Governor Murray made the statement at an emergency meeting of the Highway Commission and the Turnpike Authority to work out an agreement on the division of steel allotments—only 5,364 tons for all city, county, state, and toll-road construction. No final agreement was reached, but it was determined that the National Production Authority will be asked to increase the allocation.

The special meeting was called after J. A. Elliott, Fort Worth District Engineer for the Bureau of Public Roads, asked for the Highway Commission's recommendations on third-quarter steel shipments for the toll road. The toll road need will be deducted from the state allocation.

Needs Exceed Supply

The 5,364-ton allocation, issued for July, August, and September by NPA, was estimated by C. A. Stoldt, State Highway Director, as about one third less than for the second quarter.

"It looks like the toll road is out of business or we are," Stoldt said. "We already have under construction enough work to use up the allocation for the third quarter. In fact, we need 6,000 tons to complete construction now under way."

H. E. Bailey, General Manager for the Turnpike, said construction needs for the $31,000,000 project include 5,200 tons of structural steel and 4,500 tons of reinforcing steel. Bailey declared the Turnpike needed 1,580 tons for the third quarter alone.

Hopes CPM Will Help

Of all the officials, however, Bailey was most optimistic. He expressed the opinion that the situation might not be as bad as it looks. He said it might clear up considerably in July when NPA is slated to set up its controlled materials program under the Department of Commerce. Thereafter, he said, all highway construction projects will be rated and given priority numbers. The priorities will control the availability of materials.

"We've always been able to get help from the NPA when we were hurt badly enough," Bailey told the Commission members and the Turnpike representatives. "They have been very cooperative."

Governor Murray asked Stoldt to prepare an estimate of department needs to be submitted to NPA as "an emergency must".

"If necessary," he stated, "we must give preference on what steel we get to the toll road. That project must be completed. Interest of about $3,000 a day is running."

Known as Turner Turnpike, the 90-mile toll road will relieve a serious and dangerous traffic bottleneck on U. S. 66 between the two Oklahoma cities. The Turnpike Authority was created by an act of the Oklahoma Legislature in 1950. Already the first contracts are under way, and officials expect to see the first paving links completed late this year.

New ACI Building Code Revision Saves Steel

The new "Building Code Requirements for Reinforced Concrete (ACI 318-51)," available from the American Concrete Institute, 18263 W. McNichols Road, Detroit 19, Mich., allows for improved properties of new-style deformed reinforcing bars—resulting in steel savings in reinforced-concrete construction. The new Code, adopted as a Standard of the American Concrete Institute, decreases the allowable bond stress in plain bars (including the old types of deformed bars) and increases the allowable bond stresses for the new-type bar. Top bars, those having more than 12 inches of concrete under them, are assigned lower bond stresses than bars in other positions.

According to the new provisions, all plain bars must be hooked. The new deformed reinforcing bars develop sufficient anchorage by bond alone to correspond to special anchorage with the old-type bars. Hooks are unnecessary in many cases.

The Code covers the proper design and construction of reinforced-concrete buildings. It is written so that it may be incorporated verbatim or adopted by reference in a general building code. Earlier editions of it have been widely used in this manner.

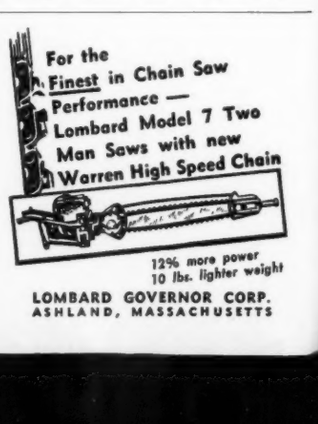
The Code is available from American Concrete Institute at 50 cents per copy.

Continental Sales Manager

Edward J. Brichta is Sales Manager of the Industrial Air-Cooled Engine Division of Continental Motors Corp. He has been with the company for 15 years, and in the sales department of the division since 1948.

Continental has announced that it is building an addition to its Detroit plant.

FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO 13F, MICHIGAN


For the Finest in Chain Saw Performance — Lombard Model 7 Two Man Saws with new Warren High Speed Chain
12% more power
10 lbs. lighter weight

LOMBARD GOVERNOR CORP.
ASHLAND, MASSACHUSETTS

New Anti-Rust Paint

A new anti-rust paint is announced by the Paint Corp. of America, Fidelity Bldg., Cleveland 14, Ohio. PCA-100 paint is suitable for both interior and exterior use; it is said to prevent rust on new metal and to stop rust action on old.

PCA-100 can be applied right over rust without surface preparation such as wire brushing, scraping, or sand blasting, the manufacturer says. Upon application, it penetrates through the rust layer into the base metal and seals the surface against further rusting, they report. The paint may be applied by either brush or spray.

PCA-100 is furnished in black only and should be used only as a finish coat. A companion product, PCA-101, a clear paint effective for rust prevention, can be painted over with a standard paint of any color.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 463.

The Hykap loader has a lift capacity of 2,000 pounds and mounts on any dump truck.

A Hydraulic Loader For All Dump Trucks

A hydraulic loader which can be mounted on any dump truck has been developed by Hykap, Inc., 1621 W. Hastings St., Chicago 8, Ill. It has a lift capacity of 2,000 pounds and can load one ton per minute of loose soils, sand, gravel, cinders, etc., the company says. The self-loading feature of the Hykap enables any truck to do double duty and operate independently of other equipment in materials handling and transporting.

The Hykap is mounted on the rear of the truck to give the rear wheels greater traction and the loader stronger support. An operator can drive the truck and work the loader from the top of the cab by remote controls that are quickly attached or detached. In addition to loose material, the Hykap will lift drums or bales and can be used as a light crane.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 409.

Data on Tension Load Cell

A bulletin on the Baldwin Type P SR-4 tension load cells is announced by the Testing Equipment Department of Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa. These cells use SR-4 strain gages to sense the load. The 2-page bulletin illustrates and gives specifications for load cells of four capacities between 10,000 and 100,000 pounds.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 550.

CLEAVER-BROOKS—DISTRIBUTORS

ALABAMA—J. D. Pittman Tractor Co., 500 N. 28th St., Birmingham 2; Burford-Toothaker Tractor Co., 2521 Halls Mill Rd., Mobile; P. O. Box 1591, Montgomery 2.
ARIZONA—Arizona Cedar Rapids Co., 1726 W. Jackson St., Phoenix.
ARKANSAS—Tri-State Equipment Co., Cantrell Rd. and Booker St., Little Rock.
CALIFORNIA—Cassen Hale Corp., 22101 Meekland Ave., Hayward; Stoddard Steel Corp., 5001 Boyle Ave., Los Angeles 58.
COLORADO—H. W. Moore Equipment Co., 6th and Acoma Sts., Denver 1.
CONNECTICUT—Deephouse Equipment Co., 180-170 Farmington Ave., Berlin.
D. C., WASHINGTON 2—Hovey-King Co., 314-316 Randolph Pl., N.E.
FLORIDA—Florida-Georgia Tractor Co., Beaver and Huron Sts., Jacksonville; 3139 N. Miami Ave., Miami; P. O. Box 1511, Lakeland; Box 987, New Quincy Highway, Tallahassee; P. O. Box 2248, Tampa.
GEORGIA—W. C. Caye & Co., Inc., 787 Windsor St., S.W., Atlanta.
ILLINOIS—Hilliman Equipment Co., Box 170, Bloomington; 2000 N. Hawthorne, Melrose Park; Wisner, Inc., 821 Main St., Peoria; 1319 Broadway, Rockford, 526 - 11th St., Rock Island.
IDAHO—Intermountain Equipment Co., Broadway at Myrtle St., Boise; 210 N. Fourth, Pocatello.
INDIANA—Reid-Holcomb Co., 1815 Kentucky Ave., Indianapolis.
IOWA—James W. Bell Co., Inc., 1720 1 Ave., N.E. Cedar Rapids; 2818 Fifth Ave., Des Moines 13.
KANSAS—The Victor L. Phillips Co., Box 1557, Wichita.
KENTUCKY—Bogle Equipment Co., 801 E. Third St., Lexington 47; 1212 S. Seventh St., Louisville.
LOUISIANA—Frank P. Fischer Engineering Co., 7924 Maple St., New Orleans 18.
MAINE—Parker-Danner Co., Riverside Drive, Augusta.
MASSACHUSETTS—Parker-Danner Co., 25 Factory St., Hyde Park 36; 71 Needham St., Newton Highlands.
MICHIGAN—Eddy & Co., 1377 E. 8 Mile Rd., Detroit 20; 2500 S. Pennsylvania Ave., Lansing 4; Straits Engineering Co., 400-2 Ashmun St., Sault Ste. Marie.
MINNESOTA—Ruffridge-Johnson Eq. Co., 250 Tenth Ave., S., Minneapolis.
MISSISSIPPI—Watkins-Aldridge Equipment Co., 912-916 S. State St., Jackson.
MISSOURI—The Victor L. Phillips Co., 16th and Baltimore Sts., Kansas City; The George F. Smith Co., 5215 Manchester Ave., St. Louis.
MONTANA—Hall-Perry Machinery Co., 304 Pratt Bldg., Billings; 802-812 E. Iron St., Butte; Coram; P. O. Box 387, Great Falls; Missoula.
NEBRASKA—Anderson Equipment Co., 200 Merchants Nat'l Bank Bldg., Omaha 8.
NEW HAMPSHIRE—Parker-Danner Co., 507 Elm St., Manchester.
NEW JERSEY—R. E. Brooks Co., Route 17, Box 17, Hasbrouck Heights.
NEW MEXICO—R. L. Harrison Co., Inc., 1801 N. Fourth St., Albuquerque.
NEW YORK—Syracuse Supply Co., 76 Wall St., Binghamton; 2080 Military Rd., Buffalo 17; R. E. Brooks Co., 50 Church St., New York; Syracuse Supply Co., Portville Rd., Olean; Van's Equipment Sales, Inc., Routes 9 and 20, Rensselaer; 1349 University Ave., Rochester; Syracuse Supply Co., 294 Almley Drive, Syracuse.
NORTH CAROLINA—North Carolina Equipment Co., P. O. Box 5006, Asheville; P. O. Box 1205, Charlotte; P. O. Box 128, Guilford; P. O. Box 655, Wilmington; 3101 Hillsboro St., Raleigh.
NORTH DAKOTA—Northwestern Equipment, Inc., 715 11th St., Bismarck; 901 Eighth St., Devils Lake; P. O. Box 110, Dickinson; P. O. Box 152, Fargo; P. O. Box 335, Minot; P. O. Box 826, Wahpeton.
NEVADA—Sierra Machinery Co., 307 Merrill Ave., Reno.
OHIO—The W. W. Williams Co., 814 Main St., Cincinnati; 18301 Brookpark Rd., Cleveland 11; 835 W. Goodale Blvd., Columbus; 1250 Conant St., Maumee.
OKLAHOMA—The Victor L. Phillips Co., 1101 E. Archer, Tulsa; 1222-24 W. Main St., Oklahoma City.
OREGON—Howard-Cooper Corp., Highway 99E, P. O. Box 633, Albany; Highway 99, P. O. Box 86, Central Point; P. O. Box I, Coquille; First and Van Buren, Eugene; 5821 N. E. Glisan St., Portland 13; 225 E. 2nd Ave., S., Roseburg.
PENNSYLVANIA—The Capitol Equipment Co., 5100 Paxton St., Harrisburg; Alan A. Wood, 1649 N. Broad St., 985 Hardt Bldg., Philadelphia; Grave-Doyle Co., 2501 Preble Ave., N.S., Pittsburgh 12.
RHODE ISLAND—Parker-Danner Co., 139 Allens Ave., Providence.
SOUTH CAROLINA—South Carolina Equipment Co., 444 Gadsden St., Columbia.
SOUTH DAKOTA—Sioux Road Equipment Co., 500 E. Sixth St., Sioux Falls; Box 941, Rapid City.
TENNESSEE—Wilson-Woessner-Wilkinson Co., 202 W. Morelia Ave., Knoxville; Tri-State Equipment Co., 124 E. Calhoun Ave., Memphis; Wilson-Woessner-Wilkinson Co., 310 S. 2nd St., Nashville.
TEXAS—Alamo Iron Works, Brownsville; Corpus Christi; Tri-State Equipment Co., 500 E. Overland St., El Paso; Conley-Lott-Nichols Machinery Co., 1311-19 S. Ervay St., Dallas 1; 3501 Avenue "H," Lubbock; Tri-State Equipment Co., P. O. Box 472, Odessa; Alamo Iron Works, Santa Clara & Montana Sts., San Antonio 6.
UTAH—Kimball Equipment Co., 222 W. 17th St., S., Salt Lake City 10.
VIRGINIA—Hampton Roads Tractor & Equipment Co., W. 39th St. and Killam Ave., Norfolk; Natural Asphalt Corp. of Virginia, 1901 Hamilton St., Richmond.
WASHINGTON—Glenn Carrington & Co., 91 Columbia St., Seattle 4; Howard-Cooper Corp., 5045-55 - 4th Ave., S., Seattle 8; Intermountain Equipment Co., 611 E. Sprague, Spokane.
WEST VIRGINIA—West Virginia Tractor & Eq. Co., P. O. Box 473, Charleston; P. O. Box 587, Clarksburg.
WISCONSIN—The Stone Manufacturing Co., 321 N. 25th St., Milwaukee 3; Badger Equipment Sales, Inc., Route 2, Thiensville.
WYOMING—Studer Tractor & Equipment Co., East Yellowstone Highway, Casper.
ALASKA—Glenn Carrington & Co., c/o Westward Hotel, Anchorage.
CANADA—Mussens Canada, Ltd., Church St., New Brunswick, Fredericton; Coleman Machinery Co., Ltd., 101 Upper Water St., Nova Scotia, Halifax; Mussens Canada, Ltd., 65 Colborne St., Montreal 3; Ontario Equipment & Supply, Ltd., 111 Merton St., Toronto, Ontario; Frost Machinery Co., Ltd., 971 Erin St., Winnepeg, Manitoba; International Agencies & Machinery Co., 2315 Cambie St., Vancouver, B. C.; Mussens Canada, Ltd., Charest Blvd., Quebec.

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Hundreds of Cleaver-Brooks units are at work meeting vitally important "RUSH" military assignments and making quick work of building roads, airports, landing fields, military bases.

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PORTABLE AND STATIONARY STEAM BOILERS

Channel Is Bridged By Freeway Crossing

Reinforced - Concrete Piers, Structural - Steel Girders, and Concrete Deck Feature Flood-Channel Crossing

• IN the Los Angeles master plan of freeways there are many bridges and overcrossings. Some are widely scattered. Some seem to grow in isolated places without rhyme or reason. But inevitably they fit into the modern freeway system as other parts are built.

Typical of such a structure is the Anaheim Street Bridge, which crosses the Los Angeles flood-control channel and the future Long Beach Freeway near the city of Long Beach, Calif. Guy F. Atkinson Co., widely known west-coast contractor from Long Beach, South San Francisco, and Portland, is busy on a $1,575,844 bridge contract with the Long Beach Harbor Department, the agency which is engineering and supervising the concrete and steel structure.

Work has been under way since 1950, when Atkinson began the first contract. That contract included the east abutment and the six river piers which are set in the bed of the Los Angeles flood-control channel. When the second half of the bridge came up for contract, the Atkinson organization, already on the job, was in a nice bidding position. The second part, on which work is now under way, includes the west abutment, the overpass structure for the Long Beach Freeway, ramps and retaining walls, and the concrete and structural-steel deck.

A Major Structure

The Anaheim Street Bridge will be a major structure in the over-all southern-California freeway pattern. With its intricate system of cloverleaf approaches, and with its complicated forming and design, it is not an easy bridge to build.

All told, the bridge will be about 2,000 feet long from approach to approach. The structural span from the two abutments to each adjoining river pier is 96 feet. The span between the six river piers is 114 feet in each case.

The river piers are approximately 44 feet tall, measured from the cutoff point of bearing piles to the topmost level of the piers. Construction of these piers required steel sheet-pile cofferdams, pile driving, and extensive unwatering.

The structural framework supporting the bridge deck consists of 14 rows of longitudinal steel girders, 8 feet deep with 2½-foot flanges, spaced on uniform 8-foot centers. Conventional X-bracing with smaller steel members is included in the H2O-S16 1949 loading

(*Continued on next page*)

C. & E. M. Photo

A Bucyrus-Erie 38-B crane hoists concrete via a Gar-Bro bucket to one of the piers for the underpass structure on the Atkinson contract.

All wheels steer...all wheels drive ...all on TIMKEN® bearings

WITH all wheels steering *and* driving, this Austin-Western grader gets 30% more power at the blade, and can turn around on a 30-foot road with but one back-up. Timken® tapered roller bearings in the wheels and steering pivots carry the toughest loads, help keep the grader out of the repair shop and working steadily on the job. And Timken bearings in the front and rear bevel pinions, front bull pinion shaft, rear bull gear case and transfer case give the grader added assurance of trouble-free performance.

Line contact between the rollers and races of Timken bearings provides extra load-carrying capacity. Tapered construction enables them to take both radial and thrust loads. Wheels and shafts are held in rigid alignment reducing wear on moving parts. Gears mesh with accuracy, assuring a smooth flow of power.

Timken bearings practically eliminate friction due to incredibly smooth surface finish and true rolling motion. And more effective closures are possible with Timken bearings because housing and shaft are kept concentric. Dirt and grit are kept out; lubricant kept in.

Backed by more than half a century of bearing research and development, Timken bearings are first choice throughout industry. If you build or buy construction equipment, make sure it's equipped with Timken bearings. Always look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

How **THE AUSTIN-WESTERN COMPANY** mounts Timken tapered roller bearings on the front axle of their No. 99-H Power Grader for long life, minimum maintenance.

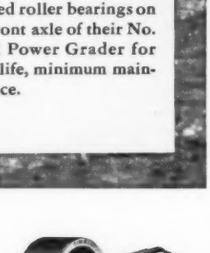
IT'S TIMKEN BEARINGS FOR VALUE!

To get the best value in bearings you may find this simple formula helpful:

$$Value = \frac{quality + service + public\ acceptance}{price}$$

Obviously a big advantage *above* the line gives you more value than a small one *below*. No other bearing can match the uniform high quality, engineering and field service and overwhelming public acceptance you get with Timken bearings.

TIMKEN TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER — BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION

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ST. PAUL 1, MINN.

KNOW THE CAPACITY!

design. A six-month steel delay has already slowed the project down, and it may be late in 1951 before this material arrives.

The bridge deck will be divided into two sections. There will be half of a 4-foot dividing median in each section. The roadway section measures 36 feet wide, curb to curb, and there is a 5-foot sidewalk which partly cantilevers out from the outside girder. The division of the bridge deck maintains the divided expansion continuity of the whole structure, since the piers also are split with an expansion joint. In addition, the abutments have expansion joints between the pier section and the wing walls.

Odd tapered sections, designed partly for clearance, partly for strength, and partly for architectural beauty, are typical of piers and abutments. For example, the back wall of each abutment pitches upward on a 2½ to 12 slope. Many of the piers are also in proportion. For that reason, extensive and elaborate preliminary surveys were necessary so that center lines of each pier and abutment could be established, the angle points established and those center lines prolonged to offset points, and permanent reference points set in.

A service road also had to be re-established across the river channel, but this proved to be no particular problem after the operator on a 38-B Bucyrus-Erie dragline found a suitable sand stratum nearby in the bed of the river.

Pier Pile Driving

The same general pile-driving methods prevailed on the second contract as were typical of the first, except that the piles were different. On the first job, the piles were cast-in-place units, made by driving a hollow pipe mandrel and filling it with truck-mixed concrete. The second part of the job, where pile-driving locations were much more accessible, called for 1,042 sticks of precast-concrete piles, 15 inches square and 40 feet in length.

These piles were precast right on the job. The subcontract for all concrete is held by Consolidated Rock Products Co., and truck mixers hauled the pile material from Consolidated's commercial plant on Henry Ford Avenue, not more than 4 miles from the job site.

A venerable Bucyrus-Erie 50-B steam rig, equipped with a 90-foot boom, a set of hanging leads, a Vulcan 0 single-action pile hammer, and its own upright boiler, set to work driving the piles. Surveyors had carefully staked the location of each pile—they were on approximate 3-foot centers—so it was a simple matter to pick up a unit with the load line, swing it into the leads, spot it carefully, bell the hammer, and turn on the steam. A considerable number of the piles had to be driven on various batters, but this was done successfully by pulling the bottom of the leads to the required position. The piles were driven to a penetration of almost their full length. Despite the amount of work that represented, the driver crew averaged 20 per day in driving the 1,042 units. The pile butts left with a fine record, marred by only one unfavorable item. Reliable authority has it that this crew was art-minded, and that when it left, the better calendars which did so much for the field offices went with the boys.

Plywood Form Facing

Pier and abutment concrete, and later for exposed parts of the deck, is placed against a plywood face. The forms are so large, and the piers are so high, that the rate of pour is governed to some extent to prevent damage to forms and bracing.

A central carpenter yard at the site fabricates the panels, some of which are 28 feet square. The plywood facing is nailed to 2 x 6-inch studs, spaced on 10-inch centers. These studs are further braced by double rows of 2 x 4's, with ⅝ and ¾-inch steel tie bolts passing through the forms at 30-inch intervals. The maximum number of times the panels have been used is four. The plywood was still in good condition, but it happened to be the kind of job where no further re-uses were possible.

The pier forms usually are erected in their entirety and carefully checked before concrete is placed, to make sure every batter and each odd angle is properly positioned. With so much form surface exposed to the wind, the panels also have to be braced against movement from any direction. Heavy steel pins driven against a deadman hold cables which are stretched between the top of each form and the pins. Shop-made turnbuckles, assisted by a chain hoist, take up the slack. Timber spreaders between the pins and forms hold the forms in the opposite direction. This bracing, of course, is in addition to the steel through-ties which hold each face together.

Another intricate problem also had to be solved: anchor bolts for bridge girders. There were 42 such bolts—14 clusters of 4 each, on top of each pier—and the entire bunch had to be set so accurately that girders would fit easily into position. The plans show that the entering holes in the girders allow only ⅛ inch of play.

No-tolerance jigs were made up in the carpenter yard, so the anchor bolt heads would be held in exact position. Then a metal band was welded around the anchoring ends of each 4-bolt cluster, and it was snugged by welding to reinforcing steel, where it could not move. The bolts have metal cones which allow emergency play in the upper 6 inches of concrete if necessary, but the carpenters are depending on the templates, rather than the cones, to hold the bolt heads in the right position.

Concrete Placing

Concrete is being placed in the piers and abutments with unusual care. Truck mixers owned by Consolidated Rock Products Co. bring in the Class A concrete, and dump it to a 1-yard Gar-Bro transfer bucket. A Bucyrus-Erie 38-B crane then hoists the material to the pour. Steel hoppers, with sectional boots if necessary, guide the concrete down to the placing point, and

(Concluded on next page)

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give you big capacity + versatility + economy

★ If you want to know how good Adams Motor Graders actually are, just watch them do their stuff on really rough, tough jobs—the kind where brute strength and stamina, massive power and traction and high-speed flexibility are "must" requirements.

On big dam projects, for example, like the one above, Adams Motor Graders frequently work the clock around—cutting and spreading huge masses of tough, hard-to-manage material, building haul roads and then keeping them in fast travel condition for great fleets of heavy earth-moving equipment.

Whatever grading operations your work involves—from deep ditch cutting to high bank sloping—you'll find Adams Motor Graders have what it takes to do the job in fastest time, at lowest cost. No other machines handle so many jobs, so fast, so well—scarifying, sub-grading, fine finishing, mixing, back-filling, etc.

Ask your local Adams dealer for complete information on these great machines—or write for illustrated literature.

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Only Adams has this exclusive combination of advantages

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C. & E. M. Photo

Project Superintendent Paulson, left, gives advice to carpenters McGinnis (back to camera) and Bartley as they work on a complicated, battered wing-wall form at the Anaheim Bridge job.

Channel Is Bridged By Freeway Crossing

(Continued from preceding page)

Viber electric vibrators consolidate it.

However, the rate of pour is never so great that the forms would be endangered in the least. One of the overpass abutments has sectional legs and a solid top. The small-area legs, for example, will fill up rapidly. So when the crew reached the tops of the legs, they ate lunch and waited about an hour before resuming work. This gave the concrete a chance to stiffen, and lessened pressure from above when the remainder was placed.

There are almost 15,000 cubic yards of concrete in the bridge, and even a tough inspector would be hard-pressed to find a more beautiful concrete surface than the Anaheim Street Bridge piers show. The plywood, coupled with an intelligently designed concrete mix which has some fines and cement in it, is resulting in a dense surface, free from honeycomb and almost free from air bubbles. Very little if any hand stoning will be required. The stripped finish is the permanent finish.

When the structural steel is available, it will be erected by Union Steel Co., the structural firm which is supplying and installing that material.

C. & E. M. Photo

Once the high pier forms were built they had to be held. This view details the 2-way bracing on one of the piers.

Personnel

Field supervision of the contract operations comes directly under Jim Draine, Assistant District Manager. Palmer (Paul) Paulson, as Project Superintendent, is his assistant. Art Dorsey is Project Engineer and Ben Clemens is Project Office Manager.

Engineering and inspection for the owner, Long Beach Harbor Department, is under Frank Cramer and his assistant Leon Smith, who report directly to R. R. Shoemaker, Chief Harbor Engineer. The detail design, specifications, and plans were prepared for the Harbor Department by the engineering association of Moffatt & Nichol, J. H. Davies, and George F. Nicholson, all of Long Beach.

A Correction

There was an error in the legend accompanying the illustrations on page 61 of the July issue of C&E Monthly. Reading from left to right, the first man in the group of McCoy Co. personnel should have been identified as Sales Manager Jack Fincham instead of Service Manager George Goodwin. Also in the text on page 60 the name is incorrectly spelled "Finchan". Our apologies to our readers and Mr. Fincham.

The jacks illustrated are only a few from the Duff-Norton complete line—for every lifting, lowering, pushing or pulling requirement on all kinds of construction jobs. Jacks are available in ratchet, screw, hydraulic and air motor types—with lifting capacities ranging from 3 to 100 tons.

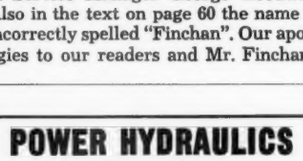
For complete data write for Catalog 203D.

THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA.—CANADIAN PLANT, TORONTO 6, ONT.

"The House that Jacks Built"

POWER HYDRAULICS for Snow Plows



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323 N. Front Ave., Grand Rapids 4, Michigan

COMMENT *from the* **BUTLER ENGINEER**

August, 1951

Alas, Alack, Eheu and Dammit!

Long ago (but still within the memory of some of us who have since grown prematurely old and gray)—a manufacturer could plan production schedules, order his materials and in turn give firm delivery dates to his customers.

Sounds like a fairy tale—but, honest injun, it's the truth!

But for darn sure it's no fairy tale we're living in today. It's a ring-tailed, oscillating, first-class nightmare. Give a look:

Vastly increased orders versus drastically cut steel supplies. Steel quotas for civilian use *slashed to 9% of mill production* . . . Moreover, we're legally required to fill defense orders up to 25% of our own production and, law or no law, every patriotic manufacturer feels it his duty voluntarily to accept that condition.

We even tried a crystal ball to find an answer, but the future was so chaotically confused the c.b. screamed horribly and burst into a thousand fragments.

Lord knows we're desperately trying to keep our customers happy. And our suppliers are doing their best for us, too.

But you and I and all of us are in the same boat (the good ship ULCER)—so let's not rock it.

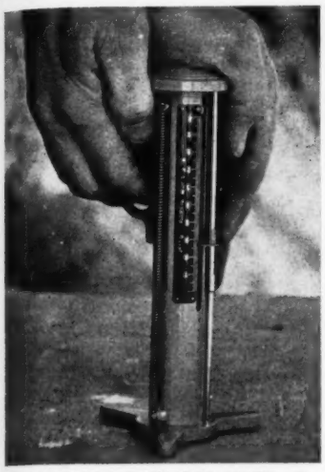
•

I was talking with a brigadier general just recently returned from Korea. Upon his arrival in that devastated land he had met a bruised, battered and bandaged sergeant in the French Foreign Legion. "What's it like here in Korea?" asked my friend.

"Sir, zis is ze hell of a war—jus' hell!" Then, with great earnestness, "But better zan no war at all."

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN



Designed for quick field checks of concrete strength, this new tester determines the strength of concrete by measuring the rebound of a spring-propelled hammer.

A New Hammer Tests Strength of Concrete

A new concrete test hammer, developed by Arthur R. Anderson, 110 Woodbury Ave., Springdale, Conn., affords non-destructive field testing of concrete. This instrument determines the compressive strength of concrete by observing the rebound of a spring-propelled hammer. The average of six to ten rebound readings can be obtained in about a minute, and a graph gives the compressive strength corresponding to the average rebound number.

While not intended to replace test cylinders, the concrete test hammer is useful for field tests, offering rapid indication of concrete strength for the removal of form work. In cold weather it will determine the safe time to dispense with the artificial heating of concrete.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 430.

Three-in-One Drill

A twist drill for woodworking has been developed by D. R. Carner Co., Inc., 106 Hospital St., Providence, R. I. The Screw-Mate three-in-one drill will countersink, drill a shank clearance, and drill a tapered pilot hole in one operation. A shoulder stops the drill at the proper depth. Screw-Mates fit any drill gun, hand drill, or drill press, and are available in many sizes. They are made from hardened and ground tungsten steel.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 497.

This Screw-Mate twist drill will countersink, drill a shank clearance, and drill a pilot hole in one operation.

Heavy-Duty Pipe Couplings

A 4-page illustrated bulletin describing heavy-duty Wedge-Lock couplings for use on temporary or permanent pipelines has been issued by Naylor Pipe Co., 1230 E. 92nd St., Chicago 19, Ill. Complete specifications on the couplings are included for lightweight pipe sizes from 8 to 30 inches in diameter.

The literature highlights the simplicity of the connection; only a hammer is required to connect or disconnect the couplings. Other features of the Wedge-Lock couplings include: compact one-piece construction, freedom for expansion and contraction, leak-proof joints, long service life, and reuse value. The four simple steps required for connection are illustrated and described. The company recommends these couplings for use on water-supply, high-pressure air, dredging, and sludge lines.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 473.

HERE'S A FASTER, EASIER, CHEAPER WAY TO HANDLE MORE DIRT, ROCK OR GRAVEL!

OMAHA STANDARD TRAILERS

The OMAHA STANDARD "CENTER DUMP" Trailer . . .

. . . Custom Built to Job Requirements is designed for contractors who want to haul dirt, gravel, rock, long or short distances, quickly and at low cost, for stock piling, spreading or dumping. Contractors say it is just what they have been looking for!

★ Each unit built to job requirements.
★ Available in sizes and lengths to meet all bridge and axle laws.
★ All *steel welded* body, chassis. Built to withstand roughest loading, toughest service.
★ Dumping mechanism FOOL-proof—trouble-FREE!
★ Release on doors INSTANT, SHOCK-PROOF, protected from material flow.
★ DOOR OPENING Meter control that can be *pre-set*.

Write at once for specifications and descriptive folder that will answer your questions and show how you can make every load a "profit" load. Address today—

OMAHA STANDARD FACTORY & GENERAL OFFICES 2411 West Broadway Council Bluffs, Iowa

For heaping buckets on loading and digging jobs . . . for handy lift-about crane service . . . for fast, accurate grading — Bucyrus-Erie's versatile Dozer-Shovel is the machine that builds profits for you on all these jobs! Precision hydraulic control of lift arms and bucket or blade means efficient operation — dumps fast or slow, or any speed in between, gets heaping loads every pass. Compact design, low overall height make the Dozer-Shovel tops for close-quarter work. Exclusive three-point mounting relieves tractor frame of all superimposed loads — means longer life, lower maintenance. ¾ and 1-yard bucket capacities available.

Ask about the record-breaking performance of the

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Bucyrus-Erie 16 and 22 cubic yard scrapers and International TD-24 crawler tractor.

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See your INTERNATIONAL Industrial Tractor Distributor

Hot-Mix on Macadam Betters 8-Mile Stretch

Asphalt Plant Setup at Quarry Turns Out Hot-Mix Material For Binder and Top Laid on Kentucky Road

• THE shortest route between Frankfort and Lexington, Kentucky, was improved last season with the paving of an 8-mile stretch on U. S. 421. The project began at the intersection of U. S. 60 in Franklin County, and ran easterly to an already paved section of U. S. 421 near Midway, close by its intersection with U. S. 62 in Woodford County.

In 1949 this piece of road was graded by the Highland Construction Co. of Louisville, and the M. T. Codell Co. of Winchester, Ky. These contracts converted an original 10-foot county road into a state highway. A thin course of stone, 2 to 4 inches thick and 23 feet wide, was put down for the convenience of traffic until the permanent paving got under way.

Last year the Kentucky Department of Highways awarded a $326,942 contract to the Middle West Roads Co. of Noblesville, Ind., for laying a Class I bituminous surface on a waterbound-macadam base over the 8-mile project. Construction got under way in April, and the work was completed by November.

C. & E. M. Photo

This is the Warren Model 500 asphalt plant Middle West Roads Co. set up outside Georgetown, Ky. A truck dumps a load of stone into a bin at the right.

Roadway Section

The waterbound-macadam base is 22 feet wide, laid 10 inches thick in Woodford County and 11 inches thick in Franklin County because of different design standards previously established. On this base was laid first a binder course, 22 feet 6 inches wide, then a top course, 22 feet wide, of plant-mix. Each course is approximately 1½ inches thick. The pavement is flanked by 10-foot shoulders. In cuts and fills under 4 feet, the sideslopes are 4 to 1, while above 4 feet the slopes are steepened to 2 to 1.

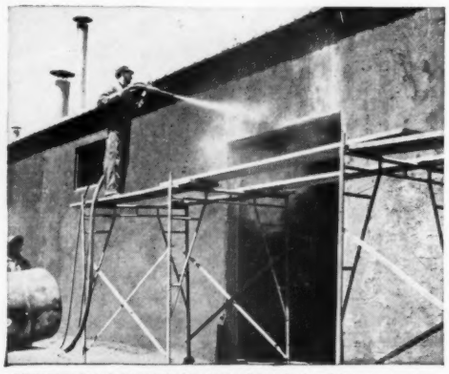
Over 70,000 tons of crushed stone for the base course were supplied by four quarries within a few miles of the project. They were Blanton Stone Co. and Frankfort Builders Supply Co., both of Frankfort; Central Rock Co. at Lexington; and Elkhorn Limestone Co. of Georgetown. The material was delivered by truck. Water used in the base construction was pumped from creeks and distributed by three 1,000-gallon tank trucks equipped with spraybars at the rear.

In building the 10-inch waterbound-macadam base, a ½-inch compacted insulation course of crushed limestone was put down first by Buckeye spreader boxes. It consisted of equal parts of No. 5 stone (1 inch to ⅜ inch) and No

(Continued on next page)

What's U. S. Rubber doing to aid low-cost building?

AIR-PLACED INSULATING CONCRETE is applied with a Bondactor® as interior and exterior surfacing material in construction of low-cost Kansas City plant addition. Using a U.S. Rubber Hose, the workman is applying ½-in. preliminary coat which stiffens the steel mesh backing to receive the specified 2 in. of pneumatically placed concrete.



ADDITIONAL INSULATING CONCRETE being blown on. The operator can control the thickness of the application to very close tolerances. Later a final ½-inch coating of sand and cement concrete is applied, to make a hard surface coating.

A new, fast construction method is now being used by contractors. Concrete walls are literally blown into place, saving valuable time and materials. The pneumatic process uses Cement Placement Hose specially developed by U.S. Rubber to stand up under the high pressures and the abrasive action of dry pre-mixed sand and cement aggregate.

U.S. Rubber hose experts have helped many a contractor and manufacturer to lower his operating costs, speed up movement, increase production. They may be able to help you. Write to address below.

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10 screenings (½ inch to 0). On top of that went a 3½-inch compacted crushed-limestone waterbound course of No. 1's (3½ inches to 1½ inches). This was followed by 6 inches of No. 2's (2½ inches to 1½ inches) of compacted crushed limestone, laid in two 3-inch waterbound courses. The No. 10 screenings were used in choking the larger stone to fill the voids.

Laid by Pavers

Two Adnun Black Top Pavers were used in laying the larger stone on the base course, working abreast of each other on the full width. The road was closed to traffic. As each course was keyed in with the screenings distributed by three Buckeye spreaders, it was compacted by Buffalo-Springfield 10-ton 3-wheel rollers of which four were on the job. A drag broom, pulled by a Farmall rubber-tired tractor, worked the screenings down into the voids, and water from the tank trucks further consolidated each layer.

In Franklin County where the base is 11 inches thick, the construction operations followed the same pattern. The initial insulation course was 1 inch instead of ½ inch, and the depth of the first layer of larger stone was increased from 3½ to 4 inches.

After the final course was laid, the surface of the base was swept off by a Littleford rotary broom, and primed with RT-2 tar applied full width from a 1,000-gallon distributor at the rate of 0.25 gallon to the square yard. By August 1 the waterbound-macadam base was finished to permit the hot-mix paving to get under way.

Pugmill Plant

For the blacktop the contractor used a Warren Bros. Model 500 asphalt plant with a 1-ton pugmill that averaged 50 tons an hour, or 600 tons for the average 12-hour work day. The plant was set up just outside Georgetown, adjoining the quarry of the Elkhorn Limestone Co. which supplied all the aggregate for the mix. It had been established at that location last year when Middle West Roads Co. had a paving job on U. S. 25 near Georgetown. PAC-5 asphalt cement, with an 85 to 100 penetration, was used in the mix and was supplied by the Shell Oil Co. of Wood River, Ill. It was shipped in tank cars to a Frankfort & Cincinnati Railroad siding about a mile from the plant. There the bitumen was unloaded into a 1,000-gallon distributor which transferred it to a 22,000-gallon storage tank at the plant. A Troy steam pump at the plant helped with the transfer.

From the quarry trucks hauled the stone a few hundred feet up a bench cut in a hillside to end-dump their loads into stockpiles below, or directly into a 70-ton hopper bin. A Northwest clamshell crane also worked from the bench, keeping the bin full of stone. A roll-type feeder at the bottom of the bin moved the material to a 15-foot cold elevator which emptied into a 5-foot-diameter x 22-foot-long dryer heated by three Gem burners at the low end. The dryer operated at the rate of 12 revolutions per minute.

A 42-inch exhaust fan on top of the dryer drew off the fines into a dust collector. Some of these fine particles settled down and were moved along to the bottom of a 42-foot hot elevator to be raised along with the heated stone to the top of the plant. The rest of the fines were carried to a settling bin that served to prevent a part of the lime dust from flying all over the neighborhood. This settling compartment was made up of a wooden frame-

(Concluded on next page)

C. & E. M. Photo

A Buffalo-Springfield roller behind an Adnun Black Top Paver on U. S. 421 in Kentucky, as a truck dumps binder-course material.

"My F-7 Ford Dump has less breakdowns and repairs," says Mr. Ward. "In rough going you can't beat Ford for gas, oil and repair economy!"

"In our fleet Fords stand up better and have more power than other trucks of the same tonnage," Ward says. He entered a 1950 Ford F-7 in Ford's big Economy Run and states:

"During the 6-month Run, our Ford F-7 traveled 23,068 miles. Loads averaged 14,000 lbs. We spent $973.89 for gas, oil, maintenance and repairs, including $260 for 3 new tires. That's a thrifty cost of only 4.22c a mile!"

Like others who rely on Ford for low running costs, you can be sure of money-saving service from your local Ford Dealer. For more facts on the trucks that last longer *and* save you money every mile—mail coupon below.

This Ford F-6 Dump for '51 is also a favorite with construction haulers. Power choice of 3 great truck engines . . . 100-hp. V-8, 110-hp. Big Six and 95-hp. Six. Available with the 5-STAR Cab or, at additional cost, the 5-STAR EXTRA Cab for more efficient driving, safety and convenience. Single speed rear axle standard, 2-speed axle also available (at extra cost) . . . with wide range of ratios for operating flexibility.

Availability of equipment, accessories and trim as illustrated is dependent on material supply conditions.

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You can use regular gas . . . you get no-knock performance. Only Ford in the low-price field gives you Power Pilot Economy.

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PIPE LOCATOR
"The Greatest Improvement in Years"
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Consider these Features:
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All these and many more at a
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THE Detectron CO.
5637 CAHUENGA BLVD. NORTH HOLLYWOOD, CALIF.

Hot-Mix on Macadam Betters 8-Mile Stretch

(Continued from preceding page)

work, 15 feet square x 15 feet high, with burlap walls and roof. Sprinklers inside wet the dust, settling it to the bottom of the shed.

Diesel-Driven

At the top of the hot elevator the stone, heated to approximately 320 degrees F, passed over a Symons 3 x 10-foot double-deck screen, and was dumped into four bins according to size. It was weighed out on a Howe scale before going to the pugmill. From the storage tank the bitumen was pumped to the weigh box by a Warren Bros. 3-inch pump. The temperature of the asphalt ranged from 250 to 270 degrees F. It was weighed on a Kron dial scale.

A Lucey 90-hp horizontal-type boiler serviced the plant. Fuel oil for its operation was supplied by the Aetna Oil Refining Co. of Louisville, Ky., and stored in a 4,000-gallon tank. Water for the boiler was pumped from Elkhorn Creek by Fairbanks-Morse electric pumps, and stored in two 1,000-gallon tanks on the side of the hill. From there it flowed by gravity to the plant.

The entire plant was operated by a single Caterpillar D17000 diesel engine which turned a 72-inch main bull wheel through a 16-inch 12-ply Goodyear belt 37 feet long. Another belt, a 6-inch 12-ply Goodrich, turned the exhaust fan. All the other moving parts ran off the bull wheel through other smaller belts or chain gears.

The Mix

Batches were mixed one minute in the 1-ton pugmill. In the binder course the aggregate was graded from ¾ inch down, a typical batch containing 1,890 pounds of stone and 110 pounds of asphalt. For the surface course, the maximum size of aggregate was ½ inch, with a typical batch containing 1,880 pounds of stone and 120 pounds of asphalt.

Up to a dozen trucks hauled the hot-mix, 8 to 10 tons a load, from the plant to the road, an average haul distance of 14 miles. It was laid by an Adnun Black Top Paver, half the width at a time, and compacted first by a 10-ton tandem roller and then back-rolled by a 10-ton 3-wheel roller, both Buffalo-Springfields. Both binder and surface courses were laid 150 pounds to the square yard, each layer averaging 1½ inches thick.

Quantities and Personnel

The major items in the 8-mile base and hot-mix paving contract included the following:

Crushed limestone,	No. 1	18,910 tons
" "	No. 2	31,275 tons
" "	No. 5	3,520 tons
" "	No. 10	16,820 tons
RT-2 tar prime		27,365 gals.
Bituminous concrete, binder		7,906 tons
" surface		7,861 tons
Seeding and protection		307,932 sq. yds.
Roadway excavation for shoulders		40,000 cu. yds.

The Middle West Roads Co. employed an average force of 15 men on the project, not counting truck drivers, under the direction of Harry Quillan, Superintendent. Barney Oldfield was Foreman on the road work, and Skip Davis was Foreman at the asphalt plant.

For the Kentucky Department of Highways, B. M. Johnson was Resident Engineer, with Elmer G. Howard, Inspector at the plant. D. H. Bray is State Highway Engineer, and C. B. Owens, Director of Construction.

Conveyor Belts Go To Nation's Mines

Most of the rubber conveyor belting made at the new $5,000,000 B. F. Goodrich Co. plant is destined for defense industries. Nearly 40 per cent of the conveyor belting will be delivered to coal, iron-ore, and other mines. The rest will go to major processing industries, public utilities, and construction projects.

Despite the greater production made possible by the opening of its new plant, Goodrich now has a 500,000-foot backlog of conveyor-belting orders on its books. One of the company's newest belts was installed in May at the new B.&O. ore dock at Curtis Bay, Md. It can move 2,000 tons of iron ore an hour and can help unload a huge seagoing ore carrier in a few hours.

New Vermiculite Uses

Eric W. Hammarstrom, Chief, Non-Metallic Building Materials Branch, National Production Authority, told members of the Vermiculite Institute at the annual meeting in Fort Lauderdale, Fla., that "Vermiculite as an insulation and as an aggregate replacing sand in lightweight concrete and plaster will greatly relieve the shortage of critical construction materials."

C. A. Pratt of Western Mineral Products Co., Chairman of the Institute's Technical Committee, described a structural vermiculite-sand concrete which weighs half as much as ordinary concrete. This new concrete is designed for floor construction where bar joists or Junior I-beams carry the slab. Recent tests of full-scale models, Pratt said, show that a 2-inch floor slab over a 24-inch-center joist spacing will carry from 15 to 23 times more live load than the 80 pounds per square foot required for many light-occupancy buildings.

Glenn Sucetti, of California Zonelite Co., told the members about an exterior stucco made by adding vermiculite concrete aggregate to the usual sand and cement mix. This stucco, he said, reduces cracking, and is easy to apply.

Gerald R. Stark of Texas Vermiculite Co., Austin, Texas, was elected President of the Institute. He succeeds Stanley K. Robinson of F. Hyde & Co., Montreal, Canada. J. B. Lyall of Vermiculite-Northwest, Inc., Spokane, Wash., was elected to the board of directors.

Diachuk Joins Gumout

Richard Diachuk has joined the Gumout Division of Pennsylvania Refining Co., Cleveland, Ohio, as a field service representative. He will assist jobbers and their salesmen in merchandising Gumout.

CUT DITCHING COSTS
with a BRISCOE DITCHER
IT DIGS
IT CLEANS
IT SLOPES
Faster, more complete cleaning jobs plus faster, deeper new ditches with the Briscoe Ditcher.
Cuts costs of digging a ditch to as low as $24 a ¼ mile! Largest model moves over 500 cubic yards of earth an hour.
CUTS COST TO 2¢ A CUBIC YARD
8 separate hydraulic controls give operator push-button action on steering, depth, leveling, tail support, wing angle, and spoil wings. Operates smoothly in water, thick brush, or heavy soil.
Complete demonstration for any Conservation District without obligation.
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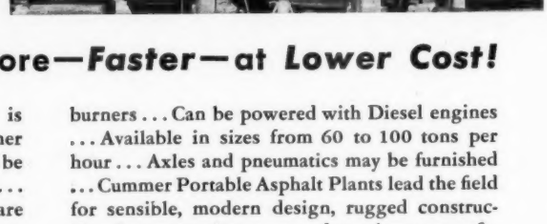
E. V. Briscoe & Son: In muck and weeds, wire grass and Bermuda, flags and tules ... the Briscoe Ditcher took it all ... with colors flying. We're thoroughly satisfied.
Clear Lake Water Co.
E. V. Briscoe & Son: We own and use 5 Briscoes for cleaning laterals ... which have cut costs for us.
Fresno Irrigation District
E. V. Briscoe & Son: A cost reduction from $100 a mile to $18 a mile.
Turlock Canal Co.
E. V. BRISCOE & SON KERMAN CALIFORNIA



Why Do We Say— "A CUMMER Plant Will Cut Your Costs... Increase Your Profit?"

Because CUMMER Portable Asphalt Plants Produce More—*Faster*—at *Lower Cost!*

The improved, big-capacity *Cummer Dryer* is fast-producing, exceptionally efficient... Cummer Portable Plants are easily transportable — can be completely assembled in as little as 12 hours... No chain or belt drives — all moving parts are individually motor driven... Cummer Plants are complete power units with vibrating screen, mixer, dust elevator, enclosed cold elevator, cold storage bin and feeder... Fired with oil or gas burners... Can be powered with Diesel engines ... Available in sizes from 60 to 100 tons per hour... Axles and pneumatics may be furnished ... Cummer Portable Asphalt Plants lead the field for sensible, modern design, rugged construction, low operating costs and continuous, profitable production. With a Cummer you *maximize* output... *minimize* overhead! Write for a Cummer Catalog today.

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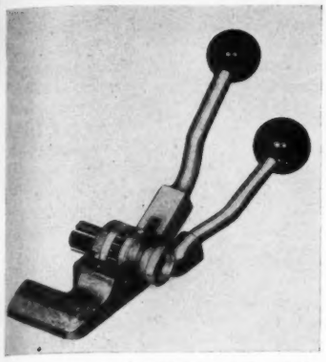
BUILDERS OF FINE ASPHALT PLANTS



The No. 120 Steelbinder pulls steel strapping of ⅜, ½, ⅝, or ¾ inch around objects of any size or shape.

New Strapping Tool

A handy addition to the line of strapping tools made by A. J. Gerrard & Co., 1950 Hawthorne Ave., Melrose Park, Ill., pulls steel strapping of ⅜, ½, ⅝, or ¾-inch size tightly around objects of any size or shape. This tool, the No. 120 Steelbinder, operates like the larger Steelbinder tools except that it does not cut off surplus strap. The surplus strap is severed by the Steelbinder hammer cutter. Short handles make the No. 120 convenient for close-quarter work on ladders, scaffolding, etc. It is compact enough to slip into an overalls pocket when not in use.

The No. 120 places no wedge between the strap and the object tied. This feature is said to provide better control of the binding operation and a tighter tie when the tool is disengaged.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 492.

New Cable Controls

Redesign of cable-control mountings for the new and larger line of bulldozers, gradebuilders, and root rippers, developed to match the new Allis-Chalmers crawler tractors, is announced by The Baker Mfg. Co., 2573 S. 10th St. at Stanford, Springfield, Ill.

The new cable models are for the HD-9, HD-15, and HD-20 tractors. Redesign provides maximum visibility, streamlined appearance, easy interchangeability, improved protection for cables and radiator, and new push-beam power tilt. The cable is located under the fender, close to the side of the tractor, protected from brush and limbs. The built-in radiator guard with perforated grill forms an integral part of the cable frame.

Interchangeability between dozer, gradebuilder, and root ripper is provided by removal of a bolt on each side, removal of wedges, and detachment of the lower sheave block at the front. The new power tilt eliminates the need for jacks or pry bars to raise or lower the push beam. Reverse tilt of the moldboard also is accomplished by power, rather than manual effort.

The entire line of Baker tractor attachments is described in Catalog No. 895, which may be obtained from the company. Or use the Request Card at page 16. Circle No. 442.

Movie on Flood Control

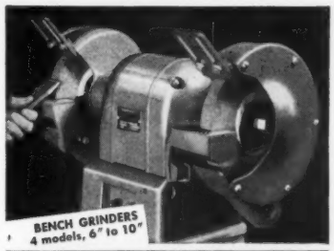
The flood-control work of the Corps of Engineers in the Lower Mississippi River Valley is the subject of "Shackles for the Giant", a 25-minute 16-millimeter sound movie in color. It shows the river's source at Lake Itasca, the Upper Mississippi and its tributaries, and the growth of the river as it flows south to the Gulf of Mexico. Sequences show the damage and suffering caused by floods prior to 1928 when the present flood-control plan was inaugurated.

Photographs and animated drawings indicate the scope of the present plan. The engineering methods used in the construction of levees, cutoffs, revetments, and reservoirs are shown in some detail. The Bonnet Carre Floodway is shown in operation, and the emergency closure of the Mulatto Bend levee slide in 1949 provides excitement.

Copies of this film for public showing may be obtained by writing to the President, Mississippi River Commission, P. O. Box 80, Vicksburg, Miss.

Truck Conservation Program

The retail branches and the dealer organization of the International Harvester Co., Chicago, are participating in a 90-day truck conservation program which began on July 1. Free inspection service is being offered for all the International trucks in operation. The company will use the information which it obtains from this part of the program as a basis for anticipating parts requirements. Mechanics are guided in their inspections by a special service manual.



Van Dorn POWER helps you SPEED UP GRINDING JOBS!

Buy Van Dorn Bench Grinders to bring the work to the tool. Buy Van Dorn Portable Grinders to bring the tool to the work. Bench models have more working clearance, better tool sharpening support. Portable models are perfectly balanced, easy to handle. Both are built with high-quality parts for *extra* years of service, driven by powerful Van Dorn motors for non-stop performance! See your nearby Van Dorn Distributor. Write for catalog to: THE VAN DORN ELECTRIC TOOL CO., 787 Joppa Road, Towson 4, Md.

FOR POWER SPECIFY "Van Dorn" PORTABLE ELECTRIC TOOLS

(DIV. OF BLACK & DECKER MFG. CO.)

THURMAN PORTABLE TRUCK SCALE

- Platform Lengths 18, 22, 24 & 30 ft.
- Capacities 20, 25 & 30 Ton

The Scale that can be moved from job to job

Special sizes made to meet special requirements

Wide Steel Bases—support scale — require no concrete footings. Easy-to-read chrome plated weighbeam with vital parts electroplated against corrosion.

Accurate and Portable—This scale can be transported from job to job by removing 6 nuts which hold side arms in place. The rest of the scale can be lifted as a unit. Once located, it can be readied for use in minutes.

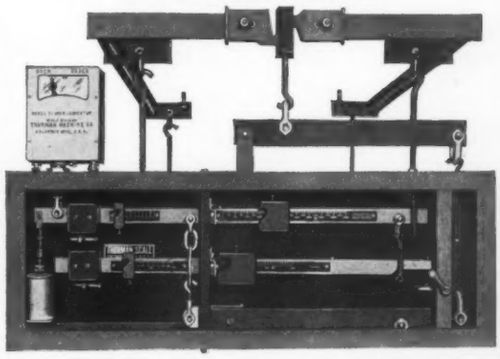
WATER SCALE

Specifically designed to weigh all types of liquids. Calibrated weighbeams can be read in pounds as well as gallons. Three chrome plated weighbeams include a subtracting beam, a main weighing beam and a fractional beam. The scale is supplied with sensitive electrical or mechanical indicator. Can be furnished with or without tank.

Write today for additional information on the Thurman Wheelbarrow, warehouse, and pit scales.

BATCHER SCALE

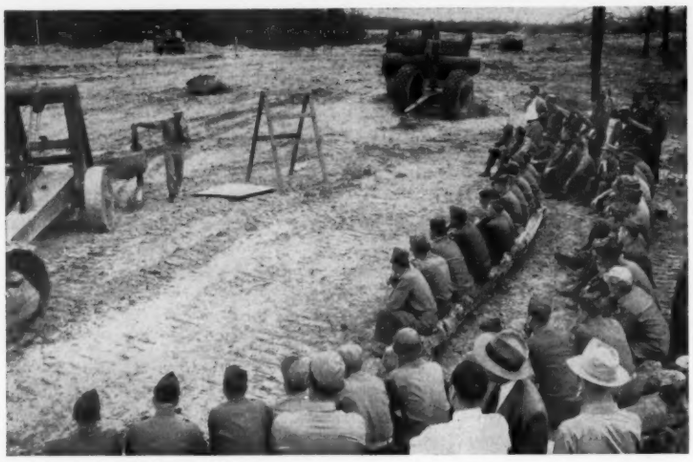
For accurate ingredient weighing



Custom-engineered to your individual needs. The Thurman Batcher Scale can be furnished with any number of ingredient beams calibrated to various capacities, as required.

THE THURMAN MACHINE CO.—Scale Division

156 North Fifth Street *Established 1918* *Columbus 15, Ohio*



Pfc. Donald N. Marshall receives instructions in lubricating a Cat D8 tractor at the Armed Forces Training School held at Fort Leonard Wood, Mo. At left, students receive instructions on the No. 18 ripper.

Earth-Moving School For Army Engineers

Classes held last spring at Fort Leonard Wood, Mo., gave 300 U. S. Army Corps of Engineers soldiers basic training in earth-moving principles and equipment application. They also taught soldiers assigned to build an airstrip how to operate their machines properly. Caterpillar Tractor Co. staffed the school with 14 instructors under a contract signed with the Corps of Engineers at no cost to the Government.

The course was given in six 3-day sessions with officers and enlisted men participating. Each class contained about 50 students. Two days were spent in the classroom where earth-moving problems were presented with the help of illustrated charts, movies, instruction kits, and earth-moving calculators. A day of equipment demonstration followed. A Caterpillar D8 track-type tractor, a DW10 rubber-tired tractor, a No. 80 scraper, a No. 12 motor grader, and a No. 18 ripper were used.

The course is the first in a series which Caterpillar will give under its contract with the Army. The company will train more than 1,900 men from combat, construction, heavy-equipment, and aviation-engineering battalions during the rest of the year. One to three-week courses will be given at 14 Army installations including camps in Virginia, North Carolina, Alabama, Wisconsin, Oklahoma, Colorado, Arizona, and Washington.

Screw-Screed Spreaders For Concrete Highways

A bulletin on the Jaeger screw-screed concrete spreader has been released by The Jaeger Machine Co., 701 Dublin Ave., Columbus 16, Ohio. It points out that the unit provides complete remixing of the concrete, initial strike-off, and precision strike-off with accurate metering. The 12-inch oscillating screed is designed to increase production and cut cost on highway paving. A number of photographs illustrate the spreader working alone and in combination with a Jaeger Type X diagonal-screed finisher. The features of the team are analyzed.

The spreader is available in two standard sizes: Model CSS-10, adjustable from 10 to 15 feet; and Model CSS-20, adjustable 20 to 25 feet. Both may be obtained without the special screed, if desired. The bulletin gives specifications and describes the operation and construction of the two models.

This literature may be obtained from the company by requesting Catalog CSS-0, or by using the Request Card at page 16. Circle No. 425.

Bulletin on Water Gates

Armco gates for water control are covered in a bulletin prepared by Armco Drainage & Metal Products, Inc., 703 Curtis St., Middletown, Ohio. The bulletin stresses their easy operation, watertightness, long service life, simple installation, adaptability to field conditions, and low cost. It suggests their use for irrigation, flood control, drainage, water supply, and sewage-treatment control. Photographs illustrate installations.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 427.

The BACHTOLD MOWER with attachments does more jobs

It SAWS. Big 20" saw blade can be used in either horizontal or vertical position. Powerful, fast.

It MOWS right up to bushes, trees, buildings, etc., cutting a 28" swath evenly. Adjustable runner. It CULTIVATES almost any kind of soil.

● Easy starting ● Finger-tip control ● Portable ● Compact ● Fully guaranteed ● Push-type and self-propelled-type models

BACHTOLD BROTHERS, INC. Forrest, Illinois

K ...is for the Knockout power in JOY PAVING BREAKERS

K-89 ... New Super heavyweight

There's real knockout power in this 90 lb. super breaker. The K-89 is designed to speed up demolition of those extra tough-and-heavy reinforced concrete sections, etc. Like all Joy SILVER STREAK Paving Breakers, the K-89 is cadmium-plated inside and out, which prevents rusting, eliminates scoring and aids lubrication.

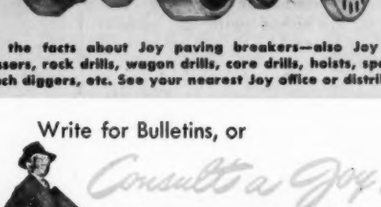
K-81 ... heavyweight

Handles tough demolition jobs economically and efficiently—breaks more concrete because it strikes more and heavier blows, and because it's easier to hold. Outstanding features of the K-81 include the exclusive Joy "Dual Valve," flat-sided cylinder for easy holding against operator's leg, replaceable chuck bushings, "U" type side rods and rugged cam-type retainer.

K-61 ... medium weight

Specially suited for thin-section concrete and other light demolition jobs—hard-hitting and easy-handling like the K-81, but lighter in weight. Many of the parts, such as the chuck housing, chuck bushing and throttle, will fit both the K-61 and K-81—a considerable saving in repair parts stock.

The THRIFTY JOY DUAL-VALVE Makes Air Do More Work!



Get the facts about Joy paving breakers—also Joy compressors, rock drills, wagon drills, core drills, hoists, spaders, trench diggers, etc. See your nearest Joy office or distributor.

K-31 ... lightweight

Only 30 lbs.—a powerful, easy-handling little breaker that's ideal for light demolition and all work where the operator must support the entire weight of the tool, or where footing is not solid, as on scaffolds.

Write for Bulletins, or Consult a Joy Engineer

100 YEARS OF ENGINEERING LEADERSHIP W&D C 3517

JOY MANUFACTURING COMPANY

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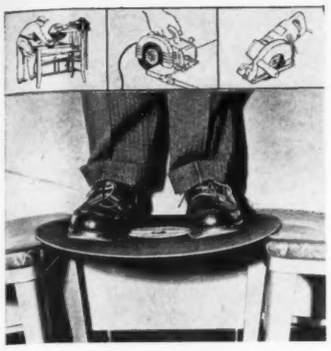

This new Clipper abrasive blade for cutting limestone, sandstone, masonry, etc., is break-resistant.

New Masonry Blade Can Be Bent, Twisted

A new break-resistant masonry-cutting blade, the B-R, has been developed by Clipper Mfg. Co., 2803 Warwick, Kansas City 8, Mo. Dropping, twisting in the cut, or bending will not damage the B-R blade, Clipper says.

It is manufactured in layers of glass fiber cloth impregnated with resins and silicon carbide. This material is then pressed together under hydraulic pressure and processed in kilns where the temperature is controlled to insure a resilient and tough blade. Its most effective performance is in the softer range of materials such as limestone, sandstone, light-aggregate concrete products, etc., the company says. For harder materials, Clipper metal-bonded diamond blades are recommended. According to the manufacturer, the features of the B-R blade are most obvious on small hand-power tools where it is difficult to maintain a true cutting level.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 434.

Chrome-Plating Unit

A hard-chrome-plating unit has been announced by Ward Leonard Electric Co., Industrial Chrome Division, South St., Mount Vernon, N. Y. In combination with Chromasol solution, the Model A-50 Chromaster permits chrome-plating directly on cutting tools and wear parts.

The bench-mounted plating unit is compact, self-contained, and easy to operate, the manufacturer says. It can plate metal surfaces totaling 25 square inches maximum at the recommended current density of 2 amperes per square inch. The unit operates from single-phase 60-cycle 110 to 120-volt ac current.

Chromasol solution operates at room temperature. It is shipped as a concentrated liquid ready for dilution with water prior to use. The hard-chrome deposit can be applied directly on industrial steels, cast iron, and most nonferrous metals.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 491.

Data on Aluminum

The birth and growth of the second largest source of aluminum in the United States is outlined in a new book "Reynolds Aluminum and the Company That Makes It," recently issued by Reynolds Metals Co., 2500 S. Third St., Louisville, Ky. This 48-page book also contains details on Reynolds production facilities, products, fields served, and other information on the company and its operations.

The production of aluminum from bauxite, the characteristics of aluminum, the many product forms in which it is made, and the varied applications for them are all covered in the new book.

Most timely is the special insert showing a few of the many military applications for aluminum, including the world's largest warplane, America's new reconnaissance RB-36D bomber; 5-inch aircraft rockets; the powerful tank-busting bazooka; deadly napalm bombs; radar antenna towers; the Navy's new all-aluminum PT boat; pontoon bridges; protective packaging; and many others.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 451.

The Austin Co. Expands

The Austin Co., Engineers and Builders, Cleveland, Ohio, has moved its eastern district offices in New York City to the 600 Fifth Avenue Building where it will occupy the entire 14th floor. The company has also expanded its eastern operations center at Roselle, N. J., to accommodate more engineering and supervisory personnel. The Roselle office has approximately 20,000 square feet of floor space.

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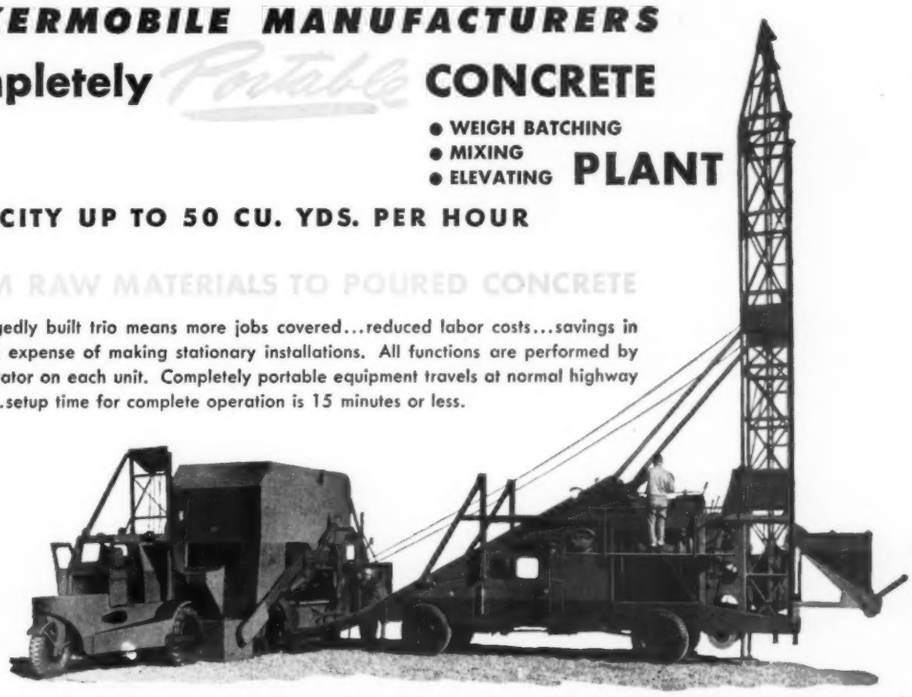
CAPACITY UP TO 50 CU. YDS. PER HOUR

FROM RAW MATERIALS TO POURED CONCRETE

This ruggedly built trio means more jobs covered...reduced labor costs...savings in time and expense of making stationary installations. All functions are performed by one operator on each unit. Completely portable equipment travels at normal highway speeds...setup time for complete operation is 15 minutes or less.



MIXERMOBILE WEIGH BATCHER · Model WB-1

Completely portable unit weigh batches aggregate on the job. Can be charged with front end loader from storage piles or directly from dump trucks. Single operator sets up unit for operation in 15 minutes. Weigh batches up to 50 cu. yds. per hour.

- Three 7 cu. yd. bins and 2 cu. yd. skip store up to 23 cu. yds. of aggregate.
- Charging skip hydraulically operated.
- Bin selector located by skip control directs skip.
- Equipped with either dial or beam scales.
- Weight, 17,800 lbs; height, 12 ft.; width, 8 ft.; overall length, 28 ft. (with skip down).
- Mounted all around on 8.25x20 tires.

2-YD. MIXERMOBILE · Model M-7

Completely mobile concrete mixing and elevating plant eliminates cost of hauling and erecting expensive equipment. One man handles the entire operation from mixer to deck.

- Improved batch-timer and counter insures positive mixing time.
- New electronic water meter gives unerring accuracy.
- Sturdy planetary drive hoist clutches give extra power, durability.
- Mixes up to 50 cu. yds. per hour.

SCOOPMOBILE · Model C. The versatile Scoopmobile with exclusive planetary drive has 7 "quick change" attachments. Standard ¾-cu. yd. scoop bucket permits operator to keep Weigh Batcher unit performing to full capacity.

- Loads and transports aggregate.
- Transports, elevates and pours concrete.
- Lifts and places form panels, timbers, etc., up to 4,000 lbs. capacity.

ATTACHMENTS INCLUDE: Scoop buckets in various sizes, swivel and standard type concrete hoppers in ¾ cu. yd. capacities, lift forks, crane boom, track extensions with braces up to 26 feet overall.

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Steel Welding Cuts Noise, Cost

Structural Framework for Hospital Additions Is Welded for Economy and Patient Comfort on $10,000,000 Project

C. & E. M. Photo

This is the 10-story maternity pavilion included in the expansion of Mt. Sinai Hospital, New York City. The photo was taken looking north on Fifth Avenue.

By WILLIAM H. QUIRK,
Eastern Editor

• MT. SINAI Hospital, one of the three largest privately operated hospitals in New York City, is expanding its facilities under a construction program totaling approximately $10,000,000. Three new buildings are included in the project—a 10-story maternity pavilion, 7-story Atran Laboratory, and 4-story Berg Research Laboratory. In addition, the new work takes in a vast subsurface basement area having a central kitchen to serve 3,000 persons, dining room, off-street loading facilities, and passageways for personnel and material distribution among all 20 hospital buildings. Thompson-Starrett Co., Inc., of New York, is general contractor. Work on the building job was initiated early in 1950 and is expected to be finished by the end of this year.

Fronting on Fifth Avenue opposite Central Park, the hospital plant spreads out over two city blocks from East 98th Street north to East 100th Street, and back to Madison Avenue on the east. Connections between the existing and new buildings were made possible when the hospital acquired from the City that portion of East 99th Street between Fifth and Madison Avenues.

Definite economies were effected in the new building construction with the use of welded steel framework. This choice in method of construction also eliminated the noise of riveting hammers which would have been an extreme annoyance to patients.

Founded on Rock

This first major expansion in 25 years at the hospital began with the

(Continued on next page)

C. & E. M. Photo

The 7-story Atran General Laboratory is another addition. It is viewed here from the rear. The photo was taken last winter, when salamanders were burning on the roof.

C. & E. M. Photo

The Atran lab fronts on Madison Avenue and East 99th Street. Behind it is the 4-story Berg Institute of Research, third unit in the hospital expansion.

Drawing Courtesy of Public Relations for Business, N. Y. C.

As the architects visualize the new group of buildings completed: the maternity pavilion (A), the Berg Institute of Research (B), and Atran Laboratory (C).

razing of several old residences and apartment houses, and the closing off of the East 99th Street block. The entire subsurface area at the site is rock, close to the ground line on the Fifth Avenue side and dropping off in the direction of Madison Avenue. Thus the buildings are founded on rock, directly at the westerly portion and through pipe piles where the overburden depth was too great for simple excavation. Driving the piles and filling them with concrete was handled by the I. B. Miller Contracting Corp. of Long Island City, N. Y.

The 10-story 160-bed maternity building is L-shaped, with a 160-foot frontage on Fifth Avenue and a depth of 204 feet. Behind it is the second new building, the 4-story Berg Institute of Research, measuring 64 x 54 feet. At the corner of Madison Avenue and East 99th Street is the 7-story Atran General Laboratory, also with a modified L-shape, fronting 90 feet on Madison Avenue and extending 143 feet back to the smaller laboratory building. North of the new additions and enclosed by hospital buildings is the ambulance court with an entrance off Fifth Avenue at the former intersection of East 99th Street.

In the original construction, a double-deck tunnel was built under East 99th Street to connect the nurses' 14-story dormitory building on East 98th Street with the existing hospital buildings to the north. The upper-deck tunnel was removed, leaving the lower passage on a level with the new subbasement which has a finished floor elevation of 30.0. The finished basement is at 42.8, and the ground-floor elevation is 56.5. The tunnel that was taken out measured 163 feet long, 11 feet wide, and 10 feet high. Its concrete walls varied from 16 to 30 inches thick.

Careful Underpinning

Cummins, Coakley & Booth, Inc., Constructors & Engineers, New York City, did all the necessary underpinning—careful, precise, and painstaking work that was carried out in extremely limited working space. The same firm also looked after the excavation attendant on such operations. In the case of the tunnel walls, the concrete was broken up with jackhammers since blasting was out of the question in the hospital area. Two tractors with front-end loaders were lowered into the excavation pit by a crawler crane. These units picked up the rubble and ran it out on timber trestles that connected to ground level at the rear of the site.

The two sections of trestle were 35 and 40 feet long, the former ascending 12 feet in its length and the latter with a 1 on 3 gradient. They were built with bents on 10-foot centers, connected by five 12 x 12 stringers. The timber deck was 8 feet wide measured to the inside of the 12 x 12 guardrails. The trestles were also used by trucks in delivering transit-mix concrete to that part of the job site. The Colonial Sand & Stone Co., Inc., supplied the project with concrete from its plant on the West Side Highway in Manhattan.

C. & E. M. Photo

Superintendent Walter Riese of Thompson-Starrett Co., Inc., discusses some features of the hospital building plans with Weldon S. Booth of Cummins, Coakley & Booth, Inc., subcontractor on the underpinning.

One tricky bit of underpinning required taking a column footing 16 feet down below its original level just beneath the ground-floor slab. As it was an outer footing, the subcontractor dug a hole alongside the building and broke through the foundation wall about 2 feet below the floor slab. Excavation by hand was then started inside the wall, and a 3 x 5-foot shaft was dug to the required depth through dirt and disintegrated rock until solid rock was reached. The sides of the vertical hole were lined with 2 x 8 sheeting laid in horizontal rings 2 inches apart, with the interstices filled with clean, firm dirt that packed hard and checked any spillage into the pit.

During the foundation work, ground water seeping through seams in the rock was collected into a 20 x 20-foot sheeted sump located at the west end of the subbasement. From this ejector pit the water was removed with 2-inch

(Concluded on next page)

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For trucks that are *right* on the job—*always* on the job—see these new Chevrolet trucks. They're able to carry the loads you handle, and able to *keep on* carrying them through tough job after tough job. They're economical and easy to handle, too . . . loaded with new features that pay off for you on *every* job. Features like the new self-energizing brakes for more *stopping* power. And like Chevrolet's Dual-Shoe parking brake . . . engineered for greater *holding* power. Here are trucks that offer important new comfort features. Ventipanes for controlled ventilation, and new cab seats for more riding comfort. In every way, these Chevrolet trucks are right for your job. See them at your Chevrolet dealer's now.

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TWO GREAT VALVE-IN-HEAD ENGINES—the 105-h.p. Loadmaster or the 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR — for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSIONS—for fast, smooth shifting • HYPOID REAR AXLES—for dependability and long life • NEW TORQUE-ACTION BRAKES—for light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—for medium-duty models • NEW TWIN-ACTION REAR BRAKES—for heavy-duty models • NEW DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • NEW CAB SEATS—for complete riding comfort • NEW VENTIPANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGN BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

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THE HAYWARD CO.,
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Hayward Buckets

Steel Welding Cuts Both Noise and Cost

(Continued from preceding page)

pumps that were kept in operation three shifts a day.

Welded Steel Framework

Ingalls Iron Works of Birmingham, Ala., fabricated the more than 2,600 tons of structural steel required for the framework of the new buildings. The members were shipped from the Pennsylvania plant of the supplier by rail and truck, and were erected at the job site by the Karl Koch Erecting Co., Inc. Crawler cranes unloaded and set members for the lower stories, after which derricks were installed to carry the steel up the rest of the way. A typical bay measured 22 feet 8 inches x 27 feet, while the largest column sections were 14-inch WF 237-pound members that decreased in size from the bottom to the top. Five welding machines were in service on what was considered one of the largest uses of the welding process in the New York metropolitan area. Economies were achieved both in material and labor. Fabrication costs were cut since welded construction requires substantially less steel, and labor savings resulted through a reduction in working force with two welders doing the work of a four-man riveting team. Only recent revisions in the New York City building code permitted the opportunity for such reduction in costs.

One of the unique features of the welding design was the assembly of several story-high trusses using butt-welded joints instead of the conventional gusset-plate connections in common use with heavy welded trusses. The trusses weigh about 50 tons, and carry seven stories of the laboratory building over a 53-foot span above a basement delivery area.

For fireproofing, the exterior steel columns are encased with 2 inches of stone-concrete. The interior columns are fireproofed either with 2½ inches of cinder block on the outside and also filling out the center core, or with 2 inches of solid gypsum block and ½ inch of unsanded gypsum plaster. Steel erection got under way on May 1, 1950, and was completed in just slightly over three months on August 7.

Concrete Floor Slabs

The structural steel supported concrete floor slabs that were placed by the Rizzi Construction Co., Inc., of New York. The 3,000-psi concrete delivered by truck mixers was raised in wheelbarrows to the desired floor level on an interior hoist tower, and then discharged into the forms. Slab depths varied to meet the requirements of different floor loads, which ranged from 40 to 175 pounds per square foot live load. A majority of the structural slabs are 4 inches thick, topped by finished materials such as terrazzo, asphalt tile, etc.

All buildings have brick exteriors with the exception of the north front of Berg Laboratory which has a marble facing. John B. Kelly, Inc., of New York City, did the masonry work, materials being raised to the required level on an outside hoist tower to supply the bricklayers working from Patent scaffolding. In general the walls have a 4-inch brick facing backed by cinder block 8 inches thick. On the north, east, and west sides, General Bronze aluminum hospital-type double-hung windows are used, while Pomeroy double-hung windows are installed on the south side.

Parts of the hospital are air-conditioned, with provisions made for extending this feature to the rest of the building at some future time. The roof is insulated with Foamglas. All buildings are steam-heated, and fluorescent lights are installed in all corridors. Heating pipes are encased in mullions—light, steel exterior columns that are spaced closely together. The Atran Laboratory building has a central system of piped oxygen, vacuum and suction, and will be equipped for work at controlled and fixed temperatures.

Personnel

An average of 300 employees were engaged in the hospital construction. Thompson-Starrett Co., Inc., the general contractor, was represented on the project by Walter Riese, Superintendent. The design for the Mt. Sinai additions was handled by Kahn & Jacobs, architect, with York & Sawyer as consulting architect. Gilbert D. Fish was consultant on the welding, while Fred N. Severud was structural engineer. Alfred Rheinstein is Chairman of the Building Committee of the hospital.

Regular purchase of U. S. Defense Bonds means personal security as well as a share in the national security.

This builder's dumpy level has a 13-inch telescope with external focusing and a 1 3/16-inch objective lens.

New Builder's Level

A compact builder's dumpy level has been designed especially for construction and irrigation work by Leupold & Stevens Instruments, Inc., 4445 N. E. Glisan St., Portland, Oreg. The telescope is 13 inches long, with external focusing and a 1 3/16-inch objective lens. Archromatic lenses produce a flat field and a magnification of 19 diameters.

The new Leupold level has a spiral screw in the eyepiece for accurate focusing on crosshairs. Its effective aperture is 1⅛ inches with a minimum focus of 6 feet and a true field of 1½ degrees. The spirit level, 5¼ inches in length, is sensitive to 60 seconds of arc per 0.1-inch graduation. The complete instrument weighs 7¾ pounds.

Like other Leupold levels, this new model features a 4-screw shifting-type leveling head, and hermetically sealed matched ball bearings in the center. The instrument is finished in baked wrinkle enamel with gun-metal trim. The tripod is sturdily constructed, has solid maple legs, and weighs 7 pounds.

More information may be obtained from the company, or by using the Request Card at page 16. Circle No. 428.

Walch Upped at FWD

Bruce V. Walch is managing the Field Service Department of The Four Wheel Drive Auto Co., Clintonville, Wis. He was formerly Manager of the Parts Sales Department.

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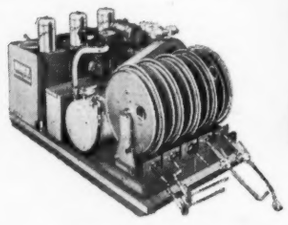

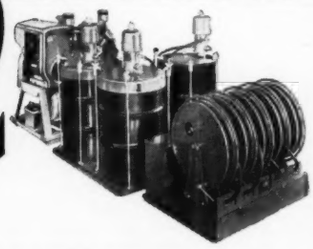

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—READY TO USE

● The grease rig that goes to work immediately! Completely self-contained, this Convoy Luber model is skid-mounted. Just slide it on truck or trailer and go to work. Has hose reels for grease, oil and air; powerful high volume pumps; a tool box and all the other parts and fixtures you'll ever need. The new Graco catalog tells all about this unit, and what it can do for you.

JOB-PLANNED CONVOY LUBER
—EXACTLY AS YOU WANT IT

● A build-your-own unit, planned by you to give your equipment the very best greasing care. Any combination of pumps, reels and other equipment you want, depending on your needs. Charts in Graco's new Convoy Luber catalog help make your selection of the component parts even easier . . . give you specific suggestions on how to assemble the best rig to fit any condition. Available with or without air compressors.

WRITE TODAY!

NEW 24-PAGE CATALOG FOR CONTRACTORS AND CONSTRUCTION MACHINERY DISTRIBUTORS

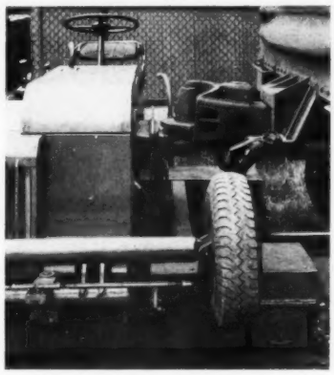
GRACO Convoy Lubers
Keep costs down . . . keep yardage up!

For RR Car Handling

Efficiency in hauling, spotting, and switching railway cars is the feature of the new Trackmobile, just introduced by Whiting Corp., Harvey, Ill. Small and compact, the gasoline-powered machine can travel either on the railway track or on the ground. Maximum ground speed is 25 miles per hour; speed on the track varies with the load. It can change from one to the other in 30 seconds through the use of hydraulic jacks. The jacking power is also employed to develop greater pulling power.

The Trackmobile couples to any standard railway car. When coupled, the hydraulic jack in the Trackmobile raises the special Whiting coupler, forcing the Trackmobile down on the track. A portion of the car's weight is thus transferred onto the Trackmobile, enabling it to develop a maximum drawbar pull of 7,350 pounds.

The Trackmobile uses four standard AAR steel wheels for track travel. The four rubber-tired wheels for ground travel are hydraulically retracted when the Trackmobile is positioned for track operation. One operator easily controls the transfer from one set of wheels to the other.



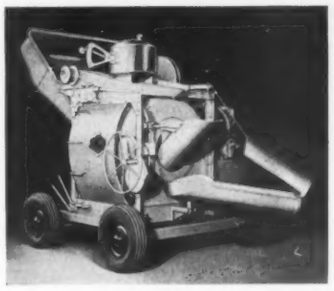
The Whiting Corp.'s new Trackmobile railroad car handler couples to any standard railway car.

Further information may be secured from the company by requesting Bulletin TM-101. Or use the Request Card at page 16. Circle No. 450.

Gear and Sprocket Catalog

A 20-page bulletin about the facilities and services of The Earle Gear & Machine Co., 4711 Stenton Ave., Philadelphia 44, Pa., is now available. The company has a modern plant equipped with efficient machine tools, a stock of over 40,000 gear patterns, an assortment of cutters and hobs, and services designed to meet unusual requirements. The catalog shows the kind of gears manufactured and gives blueprints and ordering information. It also illustrates other products manufactured by the company such as racks, sprockets, sheaves, and special machinery of which gears are a part.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 416.



This new Non-Tilter 16-S concrete mixer was recently announced by T. L. Smith Co. of Milwaukee.

New ½-Yard Mixer

A new ½-yard 16-S mixer has been announced by The T. L. Smith Co., 2835 N. 32nd St., Milwaukee 10, Wis. The Non-Tilter is equipped with a 4-cylinder air-cooled gasoline engine, syphon-type water-measuring tank, and pneumatic tires. It can also be equipped with a 4-cylinder radiator-cooled engine or electric motor. The large-diameter drum has a wide skip nose and discharge spout.

Other features include: channel-section welded supporting frame; universal-acting spring suspension; adjustable shock-absorbing V-belt drive; reduction gears enclosed in oil-tight case; skip vibrator with enclosed operating mechanism; spring stabilizers for charging and mixing cycles; anti-friction bearing-equipped adjustable drum rollers; and automotive-type steering

A self-priming centrifugal water pump, fold-back distributing spout, and batchmeter with locking device and counter can be supplied if wanted. A closed-end charging skip is furnished as standard, but a 90-inch open-end skip for loading directly from batch trucks is optional.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 468.

Bucket Loader Catalog

A catalog describing various models of the Haiss bucket loaders in the 3-cubic-yard-per-minute-capacity range is available from George Haiss Mfg. Co., Inc., Division of Pettibone Mulliken Corp., 141st to 144th St. on Park Ave., New York 51, N. Y. These loaders are available with wheel or crawler mountings and may also be fitted with a swivel belt conveyor for flexible operation.

Each of the various models is illustrated and described in detail. Engineering sketches show the dimensions of the unit. General specifications, on-the-job photographs, and data on optional equipment are included. The latter includes 4-wheel drive, differential lock, anti-friction bearings, operator's cab, hydraulic controls on bucket elevators and wheels, overload release, top-soil cutter, and other devices. Action photographs show these units handling many kinds of material.

This literature may be obtained from the company by requesting Bulletin No. H 75-77, or by using the Request Card at page 16. Circle No. 457.

Circular on Salt Tablets

Data on Pep-Up impregnated salt tablets is available from the United States Safety Service Co., 1215 McGee St., Kansas City 6, Mo. It points to the benefits of the use of salt tablets during the summer months, and to the fact that each salt crystal is individually coated so as not to cause nausea or stomach distress. Other features and additional data on the expendable dispensers for the salt tablets are included in the circular.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No 472.

on-the-job

LUBE RIG

"Most important rig on the job!"

WHEN improper greasing causes costly breakdowns, any man on the job is ready to admit the importance of good greasing equipment. But don't wait until that breakdown comes along! Put a Graco Convoy Luber to work now and you'll enjoy the closest thing to a non-stop work schedule . . . with never a slip-up due to lubricating failures.

Graco Convoy Lubers have passed the ruggedest tests . . . construction work with the U. S. Engineers, big-scale jobs with the Seabees, and hundreds of important civilian projects. And today, Convoy Lubers are heavy-duty, fast-operating, efficient rigs that will do more jobs than ever . . . better than ever.

Big feature of the new Convoy Luber is the new heavy-duty Powerflo pump . . . the pump that works around the clock, day after day, without breakdown. Convoy Luber pumps handle the stiffest grease . . . deliver faster . . . assure more thorough greasing. Pumps operate either in original drums or in hoppers.

Graco Convoy Lubers outperform makeshift lubricating equipment by a wide margin . . . give you additional savings in money and man-hours.

GRAY COMPANY, INC.

88 GRACO SQUARE

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District Offices in
New York,
Philadelphia,
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Two-Wheel Scraper For Diesel Tractor

A 2-wheel hydraulically controlled scraper for use with the John Deere R diesel tractor is announced by American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif. Model H-62, a 6-yard scraper, will work at speeds up to 12 mph.

A special hitch mounted under the tractor rear axle eliminates scraper front wheels and transfers a portion of the load to the tractor driving wheels for added pulling power. This combination wheel tractor and scraper is in effect a self-propelled scraper that digs, carries, and spreads. Pneumatic tires make between-job hauling easy.

The H-62 has a low center of gravity, a high road clearance, an independent front apron, and a rear apron that wipes the scraper bowl sides clean as the load is dumped. The company points out that simple yoke design and absence of overhead structures give the tractor operator a clear view of his work. The cutting-edge width of the H-62 scraper is 7 feet; the turning radius of tractor and scraper is 15 feet 6 inches; the weight of the scraper, complete with hitch assembly, is approximately 7,670 pounds. Scrapers come with either single or dual tires. A front wheel assembly may be added.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 405.

American Tractor Equipment Corp. builds this 2-wheel 6-yard hydraulically controlled scraper for use with the John Deere R diesel tractor.

Electric-Hammer Line

The Kango electric-hammer line is being introduced in this country for the first time by Allied Tools, Inc., 321 Central Ave., Newark 4, N. J. It consists of three sizes of hammers plus 53 different tools and 119 additional variations of them.

The heavy-duty hammer can drill 1 1/16 to 3-inch-diameter holes in concrete, break pavements, drive cylinder sleeves, and do spade work, tamping, and driving. The medium-duty hammer may be used for drilling 11/16 to 1 1/2-inch diameter holes in concrete, for rawl drilling from 3/16 to 7/16 inch in diameter, and for cutting concrete, bush hammering, tamping, vibrating, brick raking, and dressing stone. The light-duty hammer, suitable for overhead work since it weighs 14 pounds, will drill holes 1/2 to 13/16 inch in diameter in concrete, and will scale ship sides or boilers, etc. A metal carrying case and a selection of tools is supplied with each hammer.

The Kango hammer consists of a striker reciprocated by two centrifugal weights. The weights are attached to bevel gearing which is driven through a spline shaft by a specially developed electric motor. The mechanism of the Kango hammer is arranged so that the striker reciprocates harmlessly between two springs whenever the hammer is withdrawn from the work.

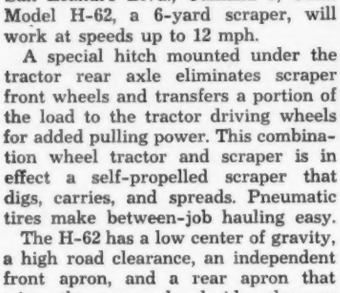
The hammer is fitted with a clutch which prevents overload when starting and prevents shocks from reaching the armature spindle when sudden changes in velocity take place as the blow is struck. A voltage-change block is incorporated in the 200 to 240-volt Kango hammers so they can be run on voltages from 200/210 or 220/240 by changing over two connections. Other voltages available are 50, 100/110, and 240/260 ac single phase, or dc.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 493.

Admixture for Concrete

A circular describing Tricosal concrete admixture is available from The Tricosal Chemical Co., 1709 W. 8th St., Los Angeles, Calif. Addition of this liquid concentrate to concrete mixtures increases workability and renders the concrete waterproof, even under high pressures, the company says. The bulletin cites other features, together with specifications, typical jobs, and testimonials of use.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 440.



"Tag Master"
"Tops" in Bucket Control

As your clamshell "flies through the air with the greatest of EASE," watch the eyes of the "sidewalk superintendents" POP!

You, too, will be delighted with the EASE with which you *cast* the clamshell, or *snub* it, or *twist* it, getting into hard-to-reach corners and picking up hard-to-manage rocks.

You'll find the tagline pull *uniform* at all bucket levels and *adjustable* to fit any job.

In addition you can use your TAG-MASTER as a *dipper-trip!*

Some of these advantages YOU NEVER HAD BEFORE . . . unless you have already used a TAG-MASTER!

For more details about this combination tagline winder and dipper trip, mail the coupon below.

MORIN MFG. CO., INC.
WEST SPRINGFIELD, MASS.

Send "TAG-MASTER" details to—

Name .....

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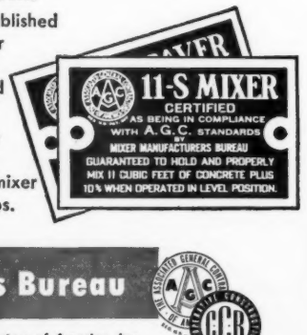
Make—Size & Model of Machine

there's a hook in it

If every mixer manufacturer tried to "popularize" a different series of drum sizes, estimating would be anybody's guess.

That's why the construction industry established uniform sizes and rigid requirements for mixers and pavers, which have been changed only where experience proved new sizes would serve better.

Whether you are a contractor, architect or engineer, the AGC Rating Plate is *your* protection. Look for it on the mixer you buy or the mixer that pours your jobs.

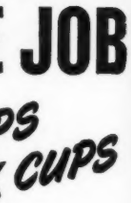


Mixer Manufacturers Bureau

Affiliated with the Associated General Contractors of America, Inc.

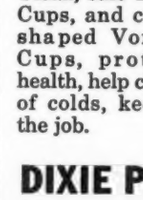
CHAIN BELT COMPANY Milwaukee, Wis.	THE JAEGER MACHINE CO. Columbus, Ohio	KWIK-MIX COMPANY Port Washington, Wis.
CONSTRUCTION MACHINERY CO. Waterloo, Iowa	THE KNICKERBOCKER CO. Jackson, Mich.	THE T. L. SMITH COMPANY Milwaukee, Wis.
THE FOOTE CO., INC. Nunda, N. Y.	KOEHRING COMPANY Milwaukee, Wis.	WORTHINGTON PUMP & MACHINERY CORP. Ransome Division, Dunellen, N. J.

SAVE TIME ON THE JOB WITH DIXIE CUPS or VORTEX CUPS



Clean, safe Dixie Cups, and cone-shaped Vortex Cups, protect health, help check spread of colds, keep men on the job.

DIXIE PORTABLE WATER CARRIER SAVES TIME



Brings water *to* the men...keeps crews *on* the job. Insulated to keep water cool for hours. Built for years of rugged use. Cover and lining of stainless steel for cleanliness. Uses either flat-bottom Dixie Cups or cone-shaped Vortex Cups.

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"DIXIE" AND "VORTEX" ARE REGISTERED TRADE MARKS OF THE DIXIE CUP COMPANY

DIXIE CUP COMPANY
Easton, Pa.

County Crew Grades Mountain Highway

Ninety-Foot Cut Is Drilled and Shot as Equipment Fights Fifteen Miles of Rock in Arizona Mountains

• BLASTING through some of Arizona's worst mountains between Superior and Ray, county maintenance crews and equipment are engaged in construction of a kind usually reserved for heavy-construction contractors. The 15-mile stretch of Pinal County road between the two towns is being improved to meet state secondary-road standards by the operation.

Ordinarily, the work would have been done by contract, but at the time the job came up, enough maintenance and construction equipment owned by Pinal County was available to push the project along slowly. Speed was not an urgent requirement. Both Superior and Ray are copper-mining towns, and the main traffic over the highway consists of automobiles of residents of the two places.

The history of the county road dates back over three decades, when a crooked, steep mountain road was built to connect the two places. Later on, it was modified from time to time, but it was still considerably substandard to secondary-road standards. Rated from the standpoint of importance, the section was fairly high, so postwar plans included a scheme to improve, realign, and regrade the highway to a 30-foot roadbed, capable of meeting the BPR standards for highways carrying 400 vehicles per day.

Pinal County was not in too solvent a position, but there was a small reserve from the postwar fund. As County Engineer Louis Fiscel says, "That money, and what we could steal from maintenance", carried the work the first seven months after its start in November of 1949. The remainder of the project is being financed by a $50,000 item set aside in this year's county budget.

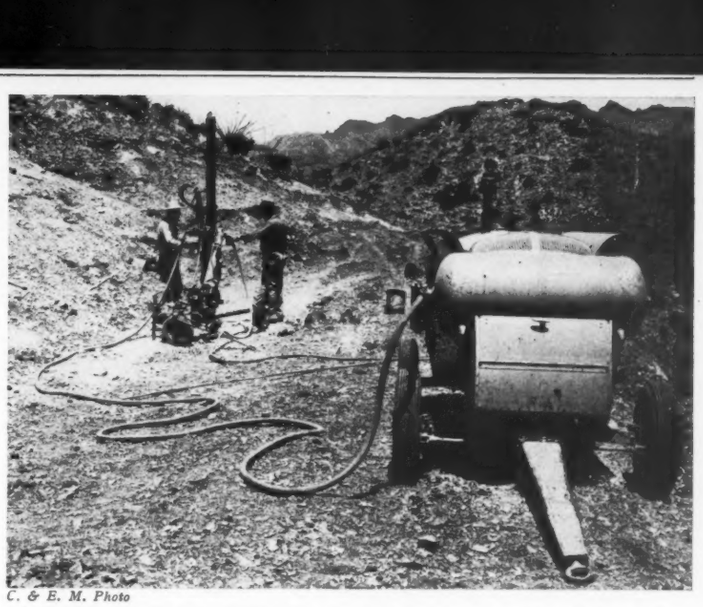
Realignment requirements have made it necessary to reroute the road on new location in many places. Heavy rock excavation is the rule, rather than the exception. In one pass, a 90-foot rock cut was necessary to get a 10 per cent grade up the mountain. Location surveys, cut and fill staking, and preliminary estimation of quantities were made before the job was begun. The work by county forces is limited to actually grading a new roadbed 30 feet wide at the top. The production and installation of select granular subbase course, and the road-mixing of a 2-inch bituminous surface cake are both expected at this time to be contract operations under a Federal-Aid secondary project.

Selection of Machines

Equipment selected for the job necessarily had to come from the county pool, and since Pinal County's normal construction work never approaches the magnitude of the Superior-Ray undertaking, some of the equipment was light. But Fiscel pulled everything that was available, established a point of authority on a high pass about halfway between Superior and Ray, and made the following spreads of equipment:

From Superior to the pass, he assigned three Allis-Chalmers HD-10's and two LS Carryalls. There was an Allis-Chalmers HD-7 tractor and a ripper, an AD-4 motor grader, a 105-cfm Worthington Blue Brute compressor, a Le Roi 210-cfm machine, and a light Cleveland wagon drill. Two

(Continued on next page)



C. & E. M. Photo

A Cleveland wagon drill, powered by a Le Roi compressor, sinks powder holes for the relocation of the Superior-Ray highway in Arizona.

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Most Economical
For information and Samples Write:
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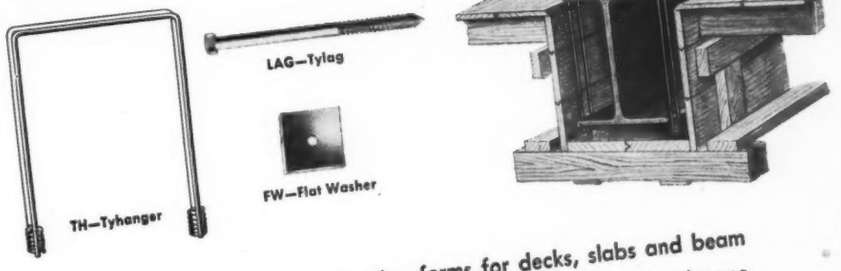
ENGINEERED TYING DEVICES, ANCHORAGES and ACCESSORIES for CONCRETE CONSTRUCTION

RICHMOND TYHANGERS WITH TYSCRU PRINCIPLE LICK A TOUGH PROBLEM IN JIG TIME



The problem of safely supporting forms for decks, slabs and beam and girder fireproofing with concrete is greatly simplified by the use of Richmond Tyscru-Type Tyhangers. Coils may be flush with the soffit, against a cut washer for a 1/8" setback, or figured to end at any specified distance from the face.

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RICHMOND KNOW-HOW—DEPENDABILITY—SERVICE—ESTIMATES & JOB PLANNING

County Crew Grades Mountain Highway

(Continued from preceding page)

Ingersoll-Rand Jackhamers, a service truck, a couple of pickups, and a 2,000-gallon water tank truck completed that spread.

From the pass to Ray, he assigned an HD-10, a Caterpillar D7 and a D6, a Southwest ripper, a Caterpillar No. 60 scraper, a No. 12 Caterpillar motor grader, a Schramm 105-cfm compressor, and two jackhammers. Every tractor assigned to the job was equipped with a dozer blade, because both dozer and scraper work was necessary.

Drilling Was Tough

Drilling has turned out to be one of the toughest features. Scattered through the job are various deposits of red quartz, conglomerate, black slate, caliche, and iron ore. Much of the rock is tough and seamy. Some is so hard that 12 standard Timken rock bits dulled in one 18-foot hole, although that was somewhat of an exception. Timken rock bits are being used throughout. Allison Steel Co. of Phoenix does the bit sharpening and tempering, and bits ordinarily will stand about four sharpenings. Drill footage per sharpening varies, but 5 feet is a good average for the job.

C. & E. M. Photo

An International-mounted Etnyre distributor shoots a seal coat of LX asphalt emulsion on an old pavement in Pinal County, Ariz. The county crew took time out from grading to do this maintenance work.

Holes are drilled on a 6-foot-square grid pattern, and drillers use great care to make sure their machines are "square with the ground" so the holes will penetrate at uniform distance all the way down. The rock is almost all hard, however, and 120 to 150 linear feet per machine per shift is an average day's drilling.

The holes are sprung rather heavily, using 60 per cent gelatin. Then from 50 to 75 pounds of 40 per cent Trojan bag powder are poured in each hole, after placing a stick of gelatin and an electric blasting detonator in the bottom.

One of the bigger cuts lay alongside the main power transmission line which feeds the town of Ray, and the big Kennecott Copper Co. works there. One of the major headaches was the fact that accidental disruption of service could do damage to Ray and its industries. Extreme care was exercised, and in many cases the shots were loaded lighter than usual. Only one accident occurred: an accidental case of a flying rock which cut a wire. There was a short delay while the power was cut off and the line was repaired.

After the shots were set off, the job remained to muck the broken material out, and to build highway fills. Despite the fact that machines are small, they are giving an excellent account of themselves by working close to capacity day after day. Monthly fill yardage often runs to 40,000 cubic yards . . . which does not seem like a big figure until one realizes that the crew often has to stop work on the grading job to go away for several days and take care of routine maintenance in other parts of the area.

With the exception of what compaction the equipment furnishes, the fills are being built without rollers. "It's not what we'd like, however," Fiscel explained. "The County has but one sheepsfoot roller, the purchase of more at this time isn't a particularly good investment, and we're building this job slow enough so the new fills will have time to settle out before the subbase and surface go in."

All through the winter months of 1950-51 the project was pushed along as fast as possible, and much of the heavy grading near the Ray end is now beginning to shape up. Generally the job shows a gratifying degree of progress.

(Concluded on next page)

1 of 10 Reasons Why UNIT is a Better Machine

There's double-barrelled efficiency in straight-in-line mounting — further proof of UNIT's superior design.

Straight-in-Line MOUNTING

The "straight-in-line" mounting of engine and main machinery, in every UNIT, contributes substantially to the life, performance, and efficiency of the machine. Power is transmitted through a worm-driven power take-off, and the reduction from engine speed to main machinery is accomplished in just "one step." This simple method eliminates many wearing parts, minimizes friction losses, and prevents dissipation of power. This modern arrangement fits compactly into smaller space, providing an extremely low overhead clearance with ample space on both sides of engine and main machinery. With this type of installation, weight is more evenly distributed, and all working parts operate in perfect alignment.

UNIT 1520 MOBILE CRANE

A ruggedly built, self-propelled rubber-tired crane—operated by ONE man—powered by ONE engine—Hook Roller construction—Air Brakes—Hydraulic steering—4-speed Air-actuated Transmission. Heavy duty, yet operated with remarkable Speed, Safety, and Economy.

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Crawler and Mobile models — ½ and ¾ Yd. Excavators. Cranes up to 20 tons capacity.

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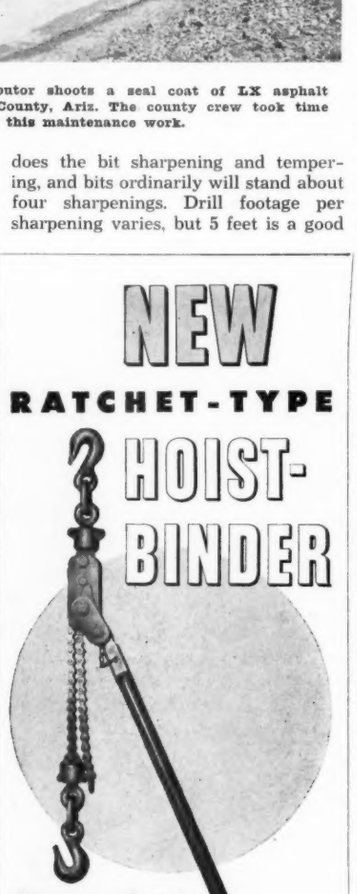
NEW RATCHET-TYPE HOIST-BINDER



Permits Quick Load Adjustment . . . Continuous Take-Up

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Find out more about the binder that gives you extra convenience and safety.

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Available in electric, gas-engine or pneumatic-driven models delivering from 11,000 to 15,000 V.P.M. Exclusive patented features assure years of trouble-free operation.

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Further information or descriptive literature can be secured from any advertisers in this issue of CONTRACTORS & ENGINEERS MONTHLY. Just write name of manufacturer and product of interest to you on the extra line provided on the post card facing page 16, fill in your own name and industry connection, mail to us and we'll do the rest.

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue New York 16, N. Y.

Maintenance Goes On

But construction or no construction, maintenance work still occupies a top priority so far as the crew is concerned. In fact, while CONTRACTORS AND ENGINEERS MONTHLY'S western editor was on the job, there was a maintenance demonstration. The road for 3 miles out of Superior has an old bituminous top, and this was deteriorating so badly that a temporary seal coat was being applied.

The application followed usual Pinal County seal-coating procedure. The old surface was first cleaned, in this case by flushing it with water. Ordinarily a power broom is used. Then approximately 0.33 gallon of LX Stancal asphalt emulsion was applied by an Etnyre distributor. Small chips, graded below ⅜ inch, were scattered at the rate of 20 pounds per square yard, using a Dodge truck for hauling and a Spred-O-Matic chip spreader.

The County, in fact, is having splendid success with asphalt emulsions. Stancal's Type L3RM material is excellent for road-mixing native material. Not only does it make a durable, strong pavement, but it can be handled in practically any kind of weather. Moreover, work can be knocked off at a given spot at any time if emergency maintenance work calls the crew, and if they do not return for several days no damage is done.

Pinal County's highway system is rated among the best in Arizona. With the county seat at Florence, the area is composed largely of rich agricultural tracts, and Pinal County citizens are proud of—and demand—good roads. Louis Fiscel, the County Engineer, has been in that post for many years, and his department's efficiency is exemplified by the Superior-Ray grading: a job that was done in spare time, so to speak, to prevent any equipment from being idle.

Heading Pinal County's Board of Supervisors is Chairman J. W. Spray, headquartered at Superior. Members include Frank Williams of Casa Grande and J. Bateman of Oracle.

New Guidance Manual

A guidance manual for engineers who are aiding young men interested in the profession has been published by the Engineers' Council for Professional Development. The 15-page pamphlet, prepared by the ECPD Guidance Committee, urges members of local societies, sections, and chapters of national engineering groups to establish guidance committees to aid high-school pupils in determining whether they are qualified for careers in engineering. The present critical engineering-manpower shortage emphasizes the need for guidance of the type indicated in this manual.

The manual explains briefly how to organize advisory committees and how to select committee members. It contains suggestions for working with high schools and secondary-school students and lists aids especially useful in counseling. An appendix titled "Shall I Study Engineering?" is a questionnaire to be filled out by the student for the use of the engineer advising him.

Copies of the manual with questionnaire may be obtained from ECPD, 29 W. 39th St., New York 18, N. Y. Price of the combination is 20 cents. The manual purchased separately costs 15 cents, and the questionnaire, 10 cents. A deduction of 25 per cent for purchases of 25 or more is allowed.

Line of Conveyors

A catalog describing a complete line of material-flow equipment, including gravity conveyors, powered conveyors, and hand and platform trucks, is available from The Rapids-Standard Co., 142 Rapistan Bldg., Grand Rapids 2, Mich. Though most of these units are designed for handling packaged products, the portable powered conveyors are suitable for use in construction. Illustrations, descriptions, and complete data are given.

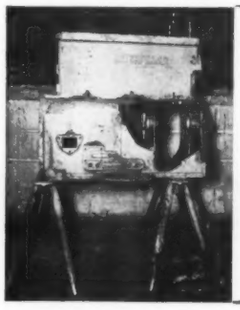
This literature may be obtained from the company by requesting Catalog GC-51-A, or by using the Request Card at page 16. Circle No. 456.

Albert Hinkle Dies

Albert H. Hinkle, Division Engineer of The Asphalt Institute, died on June 8 at the age of 71. Mr. Hinkle was the senior engineer, in years of service, on the Institute's divisional engineering staff. His long career included 44 years in highway development work in various states. He organized the Division of Maintenance of the State Highway Departments in Ohio and Indiana. In Kentucky, for the Rock Asphalt Institute, he conducted research and served as Consulting Engineer and Director. In 1919 Mr. Hinkle wrote the manual "Maintenance and Repair of Highways".

In national highway affairs, Mr. Hinkle was active both as chairman of the Traffic Control and Safety Committee of the AASHO and as a member of its Maintenance Committee. He also was a committee member of the Motor Vehicle Accidents Statistical Section, Public Safety Division, National Safety Council. He was a former secretary and president of the Mississippi Valley Conference of State Highway Officials.

In 1939, Mr. Hinkle joined the Asphalt Institute staff where he was District and then Division Engineer. He was a member of the American Society of Civil Engineers, the Association of Asphalt Paving Technologists, the Society of American Military Engineers, the Ohio Society of Professional Engineers, and the Engineering Society of Cincinnati.



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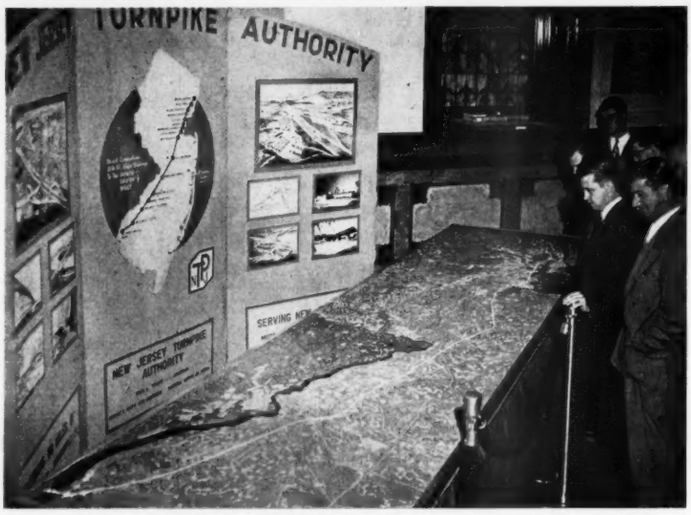
Turnpike Model Display

A 16-foot model of New Jersey's 118-mile turnpike has been placed on display in the museum of the State Capitol. Built to a scale of 1.3 inches to the mile, the model shows the route of this privately financed superhighway, its 17 traffic interchanges, and the connections leading to east-west public highways and to the metropolitan New York City and Philadelphia areas.

The exhibit, sponsored by the New Jersey Turnpike Authority, also contains scale models of a typical toll plaza and restaurant. Visitors can inspect architects' renderings of the traffic interchange at the Black Horse Pike leading to Atlantic City and other shore resorts, the Raritan River Bridge, the Authority's central maintenance shop in Hightstown, and the service area in Woodbridge.

The model will be displayed at conventions and other public functions to acquaint motorists and truckers with the turnpike route.



The public gets acquainted with the New Jersey Turnpike by studying a 16-foot model on display in the State Capitol.

tected from fire when used or stored in a "fireproof" building. Facts illustrating the fallacy of "fireproof" building protection are given in the booklet. Information on protection against fire; use of Safe-Cabinets for drawings; and use of Safe-Files and Map and Plan Units is also incorporated in the brochure.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 465.

N. Y. Good Roads News

The Board of Governors of the New York Good Roads Association has appointed John Wickham, Cutchogue, Long Island, President of the Association. He fills the unexpired term of Harold Peet, of Pike, Wyoming County. Mr. Peet was made Vice President of the Association. James F. Dalton of Albany has replaced Robert C. Burnette of Skaneateles as Secretary, and L. Judson Morhouse of Ticonderoga has replaced Charles W. Ryan of Albany as Governor of Region I.

Welding Electrode

A hard-surfacing electrode with a fast deposition rate has been introduced by Rankin Mfg. Co., 3072 W. Pico Blvd., Los Angeles 6, Calif. The welding speed of the Ranite B-X is said to decrease heat induction into the parent metal by one-third. This minimizes heat strains and helps to preserve the physical characteristics of the metal. Rankin says this is important for work on manganese steels, since excessive heat reduces the wearing quality and the toughness of these steels. The welding speed is also claimed to minimize dilution.

Further information may be secured from the company by requesting Bulletin B-X. Or use the Request Card at page 16. Circle No. 488.

To Safeguard Drawings

A handbook entitled "How Safe Are Your Drawings?" is available from Remington Rand Inc., 315 Fourth Ave., New York 10, N. Y. Recognizing that vital tracings, drawings, and specifications are part of management's productive "know-how", it indicates the multiple dangers to drawings. According to past experience, fire is the greatest. The booklet shows the kind of fire-resistant protection drawings should have.

Records or drawings are not fully pro-

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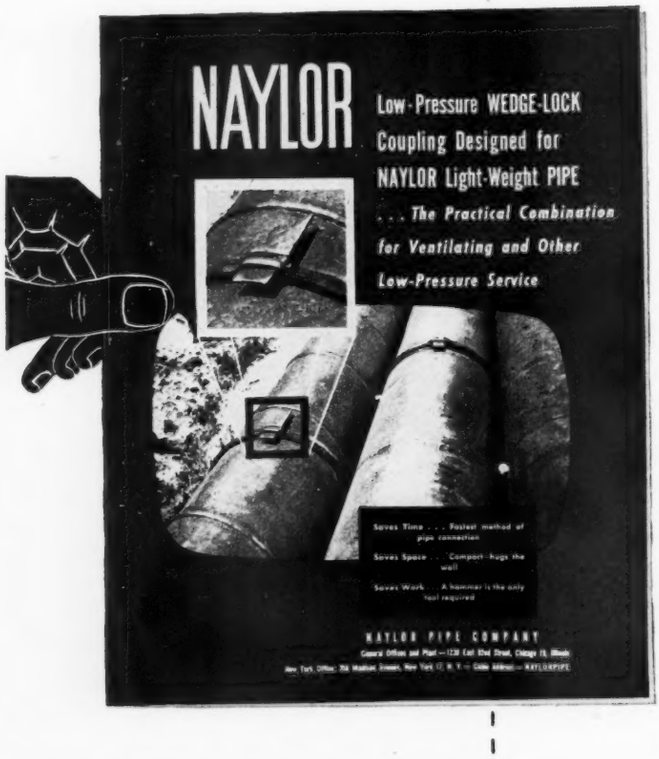
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Send for this new Bulletin No. 514 on the Naylor Low-Pressure Wedge-Lock Coupling. See how quickly and easily ventilating and other low-pressure or temporary lines can be made up with this practical coupling medium and no other tool but a hammer. Coupling sizes for light-weight pipe from 8" to 30" in diameter. Write today for your copy.

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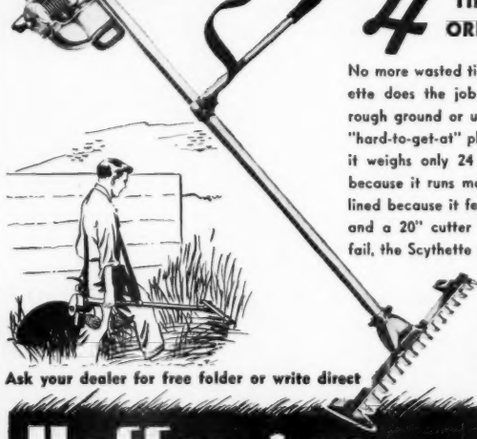

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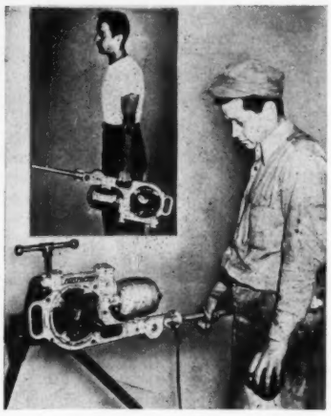
Ask your dealer for free folder or write direct

Hoffco, inc. RICHMOND, INDIANA



The new 26-pound Port-A-Pony power pipe threader is easily carried by one man. It's made by Thread-Ezy Mfg. Co.

Power Pipe Threader

A new lightweight, portable, power pipe threader has been developed by the Thread-Ezy Mfg. Co., Corunna, Mich., for threading ¼ to 4-inch pipe on the job. The 26-pound Port-A-Pony can be operated and carried by one man.

The "ring-gear" principle used turns regular die stocks at a cutting speed designed for maximum efficiency. All popular types of hand die stocks are adaptable to the Port-A-Pony, the company says. Dies can be changed, seated, and locked in place quickly. Additional speed in operation is obtained by a ½-hp 110-volt ac-dc reversible electric motor which removes the Port-A-Pony from finished threads by the flip of a switch. The manufacturer reports that the machine will cut clean, leak-proof threads on stationary pipe wherever the working area is 12 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 447.

Electric Lift Trucks

The Yale & Towne Mfg. Co., Philadelphia Division, 11000 Roosevelt Blvd., Philadelphia 15, Pa., has redesigned its line of light-capacity electric fork-lift trucks. Available in capacities up to 2,000 pounds, the Lift Kings operate at 6½ mph.

They combine sit-down operation with automotive-type controls—steering wheel, foot acceleration, pedal brakes, and gearshift-like lift and tilt controls within hand reach of the steering wheel. These are said to make operation easier. A magnetic contactor control prevents careless drivers from imposing unnecessarily severe loads on the motor. A time delay between speeds for uniform acceleration prevents jackrabbit starts that might shift and damage loads, and a special nonplugging device on the electric controller prevents power reversal in any speed but first.

The trucks also have hypoid gearing for added strength in power transmission, inclined king pins to take the rough work out of steering, and hydraulic brakes for smooth stops. No braking takes place through the gear train.

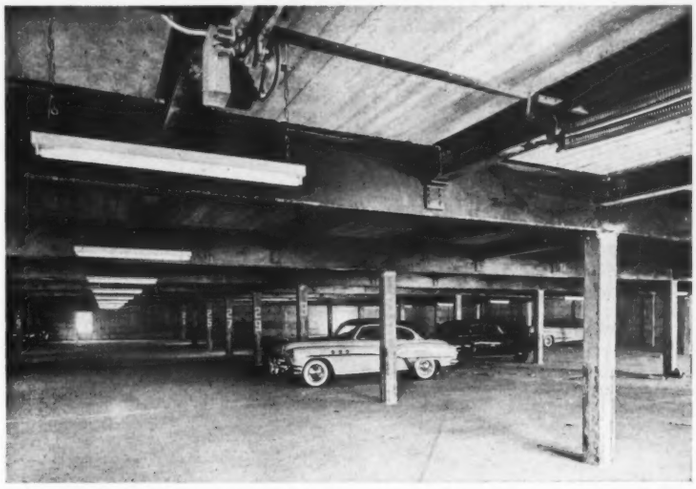
The new trucks are all-steel electrically welded. The fork carriage and elevating channel travel in upright channels by sealed ball-bearing-mounted rollers. The tilting mechanism (the mast can tilt forward 5 degrees or backward 10 degrees to center the load) is hydraulically operated.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 490.

Yale & Towne has redesigned its lift-truck line. The new models, which feature automotive-type controls, come in capacities up to 2,000 pounds.

Mar-Rail Sales Manager

Bob Duffy is now National Sales Manager for the Brik-Toter Division of Mar-Rail Conveyor Co., Pawtucket, R. I. He will spend the next 18 months calling on distributors and general contractors in order to organize a national distributor network for the division.

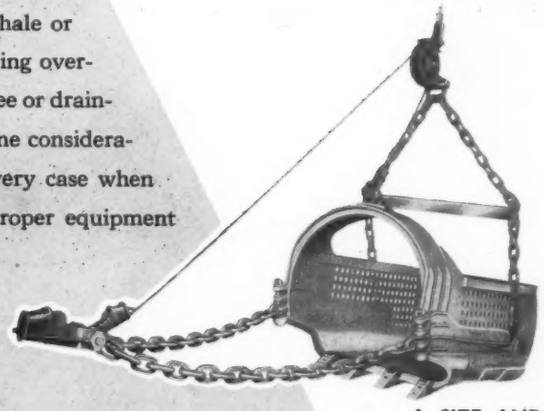


A combination garage and air-raid shelter was opened last May in Gross-Morton's Windsor Park apartment community in Queens, N. Y. Eight will be built for the tenants. They will take care of 600 cars or, in an emergency, will shelter 20,000 people. Notice the 24-inch-deep steel girders on concrete-encased steel columns.

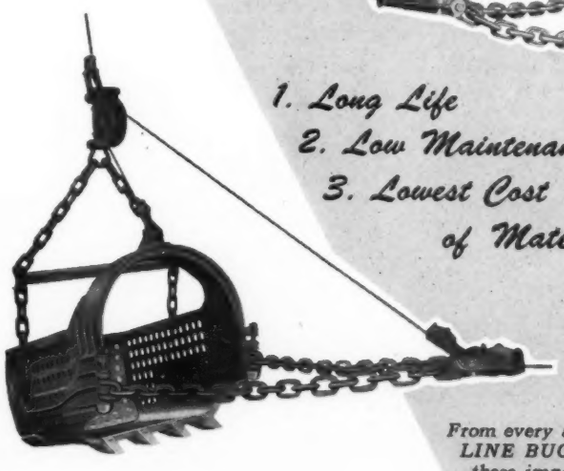
FROM ANY *ANGLE*

HENDRIX DRAGLINE BUCKETS *are your* BEST BUY

No matter what the digging job ... whether it's moving shale or hard formations, stripping overburden, dredging, levee or drainage work ... the same considerations apply in every case when choosing the proper equipment for the job.



A SIZE AND TYPE FOR EVERY DIGGING PURPOSE



1. Long Life
2. Low Maintenance Cost
3. Lowest Cost Per Yard of Material Moved

3/8 TO 40 CUBIC YARDS

From every angle HENDRIX DRAGLINE BUCKETS meet every one of these important considerations. They are RUGGED ... built for long life, require little upkeep expense and as a result, give you lowest-cost-per-yard service. So, check your digging problems from every angle. You'll find, as others have, that it pays to choose HENDRIX DRAGLINE BUCKETS ... the buckets that offer lowest per yard cost ... for every digging job.

HENDRIX Lightweight DRAGLINE BUCKETS

HENDRIX BUCKETS WITHOUT PERFORATIONS ON SPECIAL ORDER ONLY

HENDRIX MANUFACTURING CO., INC.

MANSFIELD – LOUISIANA

Conveyor Equipment Need Not Be Hazard

Care in Selecting Equipment and In Establishing Safety Rules for Conveyor Operation Was Topic Of Recent Meeting

• AN interesting paper on the safe use of conveyors was delivered by Jervis C. Webb, General Manager of the Jervis B. Webb Co., Detroit, Mich., at the 21st Annual Convention and Exposition of the Greater New York Safety Council. In addition to his practical suggestions, Mr. Webb also contributed some remarks on the economics of safety.

Safety Code

The best start toward codifying safety suggestions for this type of equipment is a document entitled "Safety Code for Conveyors, Cableways, and Related Equipment", he said. This bulletin, Number B20-1-1947, may be procured from the American Society of Mechanical Engineers. It covers the general design of conveyors, clearance and accessibility, inspection and maintenance, related structures, and general safety rules, and explains how this code depends on other codes.

Mr. Webb gave a thumbnail sketch of the code, as follows:

General Design: (1) guard drive machinery (2) use rated-load capacities (3) design mountings to eliminate catching edges and pinchings (4) have lubricating points piped out to safe positions (5) have accessible adjustments to the takeups and drives (6) use stops to prevent backups and runaways (7) have load breaks as protection against overload cutouts (8) enclose counterweights (9) interlock conveyors electrically to prevent jamming and the danger which occurs when one conveyor shuts down and the feeder still operates (10) provide positive supports for portable conveyors to prevent tipping.

Clearance and Accessibility: (1) provide space for all maintenance (2) provide for visibility of loads (3) up high, use guardrails (4) have inspection holes for enclosed conveyors.

Inspection and Maintenance: (1) lubricate regularly (2) keep takeups adjusted (3) periodically examine cottered connections and couplings (4) replace worn parts.

General Safety Rules: (1) obey rated-load signs (2) mark stop and start stations clearly (3) permit no riding on conveyors (4) allow only the regular maintenance crew to service the conveyors (5) while servicing, stop the conveyor and lock out normal starting stations (6) in case of overload cutouts, locate the jam and use lockouts before servicing.

The Mean in Safety

Mr. Webb reiterated the point well known in the field, that there is a difference between foolproof and damnfoolproof precautions. "We can go only so far in protecting operators", he said. "They must *use* the safety features." He made it quite clear that elaborate guarding is economically unsound. It could cost 40 per cent of the installation if you let it, he said. It is highly desirable that the user determine the mean in safety measures.

Conveyors as a whole have meant more safety on the job, the speaker reported. Lifting and carrying are lessened. The worker need not leave his job to get materials, thereby walking into trouble elsewhere. Conveyors also help good housekeeping since they are ins·lled on definite lines of flow and ·r continuous nature cuts down ·ling.

Greater user safety-consciousness is a must, Mr. Webb told his listeners. In any competitive industry, including the manufacture of conveyors, there are those who skimp on safety-features to have the lowest price. Users must study the specifications and demand that safety features be outlined, described, and adhered to.

Safe-Use Suggestions

Mr. Webb offered some valuable suggestions on the safe use of conveyors. He explained that they should have a preliminary test run to take the bugs out of the automatics and to relieve clearance between the guides and moving parts. It is hard to build a conveyor that does not require field adjustment after shipment, he said.

Conveyors should be operated by authorized personnel only, and speed variations should be entrusted to one who understands what effect these may have on the system as a whole. Mr. Webb suggested that the user contact the manufacturer of the equipment to determine the cause of jamming, and that he check as to whether the system is overloaded by means of a dynamometer. There should be a number of push-button stop stations along the conveyor line, and electric ground wires should be used, particularly on portable conveyors and systems operating in damp conditions.

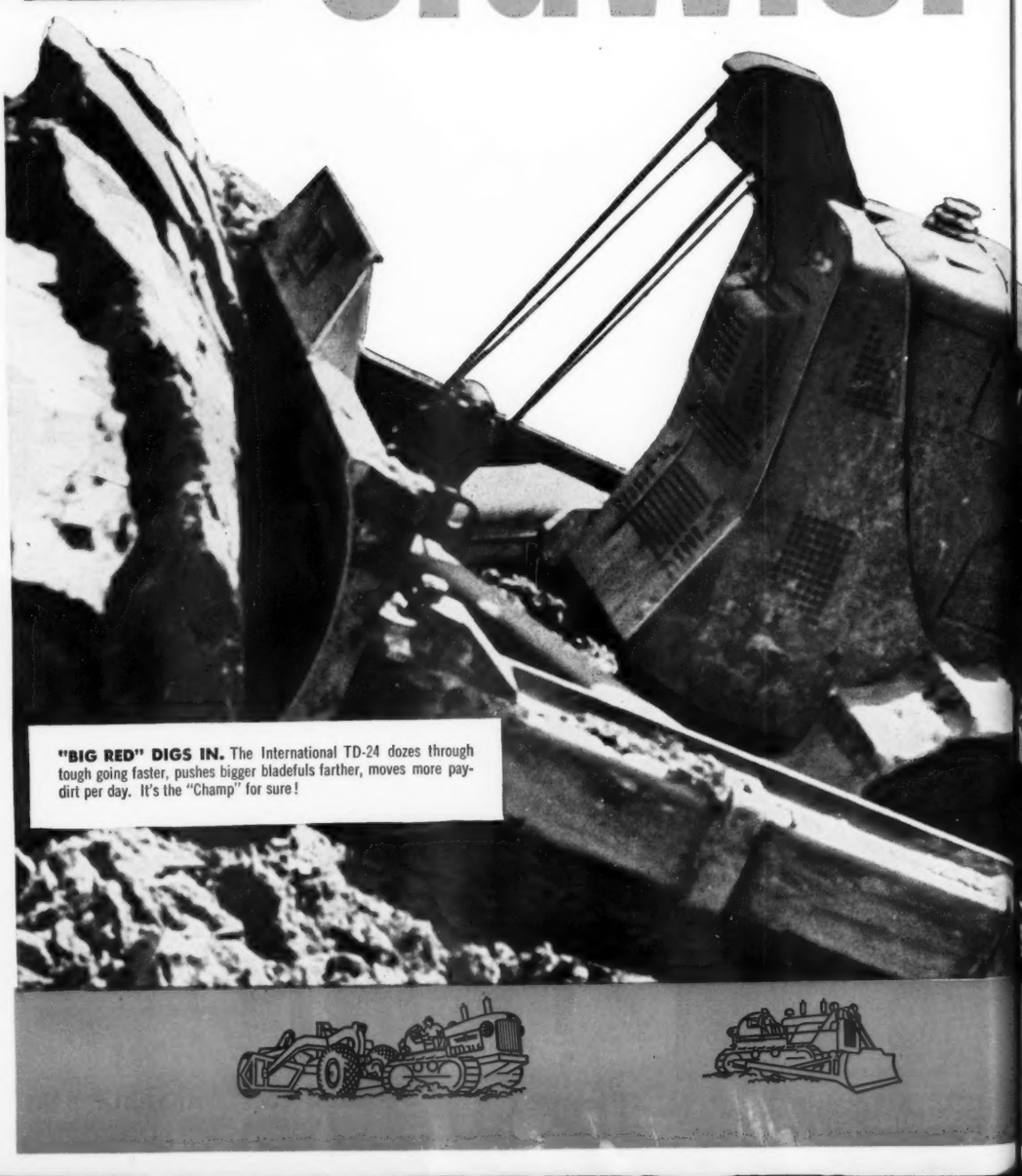
In conclusion, Mr. Webb stated: "Conveyors can be used safely and their use has contributed substantially to the workers' safety. If you set up definite rules and are sure that all concerned are acquainted with them, and if you insist that the safety specifications are high in the conveyors you buy —conveyor systems are safe."

Carburetor Cleaning

A 4-page folder on how to clean a carburetor is available from Pennsylvania Refining Co., 2686 Lisbon Road, Cleveland 4, Ohio. It contains a diagrammatic sketch of the "16 Pass-Ports to Carburetor Trouble" and describes carburetor cleaning with Gumout. Selling suggestions for dealers and tips on the operation of carburetor-cleaning services are included in the catalog.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 487.

nothing slow about this crawler



"BIG RED" DIGS IN. The International TD-24 dozes through tough going faster, pushes bigger bladefuls farther, moves more paydirt per day. It's the "Champ" for sure!

Added Tire Mileage By Simple Relugging

With much of today's construction equipment moving on rubber, tire life and greater mileage are important. American Tire Machinery, Inc., 718 S. Elliott St., Muncie, Ind., has developed the Vacu-Lug process by which the lugs on almost any size of tire used in the construction industry can be replaced.

The steps in the process are as follows: the tire is buffed and prepared; cement is applied; new lugs are built and applied; the rebuilt tire is cured in a Vitacap chamber. The company offers data that relugged tires will outpull new tires because of the higher and flatter tread furnished by relugging. It guarantees that the new lugs will stay on because they are cured to the worn tire like a weld and there is an increase in strength at the joining point. Relugged tires have been used on trucks, graders, wagons, and similar equipment owned by contractors, quarries, and highway departments.

Information concerning the location of Vacu-Lug shops or purchase of the equipment to do the job may be obtained from the company. Or use the Request Card at page 16. Circle No. 411.

Flexible-Hose Catalog

The line of hose, couplings, adapters, fittings, and hose accessories made by Aeroquip Corp., 303 S. East Ave., Jackson, Mich., is described in a detailed 40-page catalog. The catalog discusses the design, construction, and applications of each product. It includes a parts list, dimensions, and illustrations. The hose is designed for service with hydraulics, water, hot oil, crude and fuel oils, antifreeze solutions, gasoline, diesel fuels, butane-propane, and air.

Assembly instructions are diagramed in the catalog and special attention is given to the hose-cover stripping tool, the hose-line assembly machine, and the hose cutoff machine. In each case a brief description is followed by operating instructions, illustrations, and details on construction.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 415.

Read what makes International's TD-24—the Big Red "Champ"—finish ahead of the field!

Man or machine, it takes speed and strength and stamina to take on all comers and leave 'em trailing behind. It takes guts and power to spare to be the "Champ."

In a human, it means running a faster race, hitting a harder ball, fighting a tougher fight. In the TD-24, it means doing more work in less time than any other crawler on the market.

More speed—8 forward and 8 reverse speeds up to 7.8 mph for faster time cycles on the job.

More power—148 maximum drawbar horsepower—to take a bigger load on the scraper, a bigger bite on the blade and move dirt faster, easier, cheaper.

More flexibility—synchromesh shifting "on the go"—instant change up or down one speed without declutching—Planet Power steering for pivot turns, feathered turns, turns with power on both tracks.

The TD-24 gets in and out and back in again faster—moves more dirt each time—makes more money for its owner every working day.

It's the Big Red "Champ" any way you look at it.

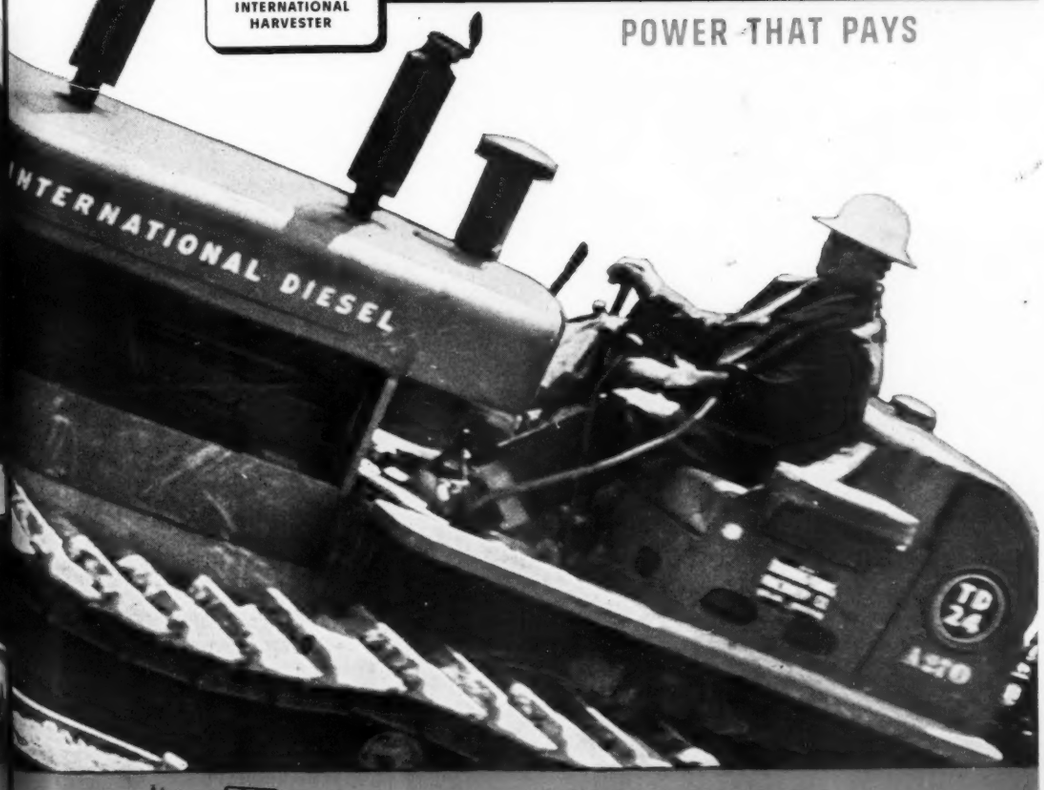
Come in and look. Ask your International Industrial Distributor for the low-down. Find out about his fast-moving parts and service setup, which will keep your International power on the job for years to come. You'll be a TD-24 man from then on in!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

INTERNATIONAL HARVESTER

INTERNATIONAL

POWER THAT PAYS



Future Land Rights Given to State Roads

A new law, passed by the Maryland 1951 General Assembly and in effect since June 1, is expected to make possible considerable saving in time and money in Maryland's state highway construction from now on. The law, stripped of legal verbiage, empowers the State Roads Commission to condemn property not only for immediate use—a power which it has possessed for some time—but for future needs as well.

In the past, the Commission, while free to accept the gift or negotiate the purchase of land beyond immediate construction needs. could not condemn beyond the limits of its impending right-of-way requirements. As a result, the Commission had been powerless to prevent commercial and residential development of property which, in view of long-range plans for new highways or extension of existing roads, it knew would eventually be needed for right-of-ways.

Two situations typical of this exist at present in Montgomery and Prince George's Counties. In Montgomery County residential developments are spreading daily in the area due to be traversed by the new road from Washington to Frederick. In Prince George's County the same sort of development is beginning to occupy land that will be needed eventually for extension of the Annapolis-Washington Expressway. In both instances the new super-highways are already under construction, the Frederick-Washington project having progressed south to the Montgomery County line and the Annapolis project as far west as U.S. Route 301.

Although lack of funds precludes further extension of either road in the immediate future, their eventual construction is deemed certain and therefore the need for right-of-ways is determinable. Under the new law, the State Roads Commission is free to act on that need whenever such action becomes imperative to prevent development that would vastly increase the property values and materially delay future acquisition.

Plastic Dispenser Feeds Salt Tablets

A new type of plastic expendable salt-tablet dispenser has been developed by Standard Safety Equipment Co., 232 W. Ontario St., Chicago 10, Ill. Known as the Crystal-M, the entire unit—plastic case and 1,000 enteric-coated salt tablets—is sealed at the factory. A release mechanism at the base delivers one tablet at a time. The dispenser is discarded when empty. An easily installed wall bracket arrangement permits quick removal and replacement. This unit is also available in a 500-tablet size.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 471.

Tractor-Mounted Digger

An 8-page folder about the Sherman Power Digger, a flexibly designed tractor-mounted backhoe, is available from Sherman Products, Inc., 3200 W. 14 Mile Road, Royal Oak, Mich. Action photographs illustrate the uses of the unit.

The Sherman digger has a loading clearance of 7 feet, a maximum digging depth of 8 feet, a 140-degree swinging arc, and a 10-foot digging reach behind the tractor. Its six hydraulic controls are grouped at the tractor seat. A standard 18-inch digging shovel and a 12-inch digging shovel are available for use with it.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 419.

Distributor Doings

Here is the new quarters of G. W. Van Keppel Co. in Kansas City, Mo. Sigmund H. Sieben designed the building. Universal Construction Co. built it.

Van Keppel Moves After 20 Years

After 20 years in the Carter-Waters Building at 2440 Penway, Kansas City, Mo., the G. W. Van Keppel Co. has moved to its own new quarters just across the street from the old location. A new 100 x 125-foot single-story building will house the well known Kansas City firm, and "Mr. Van" plans an efficient yard and storage setup to match the efficiency of his new building.

Designed by Sigmund H. Sieben and built by Universal Construction Co., the new building has a yellow-brick and glass front, with the back walls of Haydite lightweight concrete blocks. Steel I-beams support the roof through steel I-beam transverse trusses and light tubular open longitudinal trusses. The floors in the demonstration or showroom are of concrete, as they are in the parts room. Office floors are of asphalt tile on concrete.

Nobody's office except the bookkeeper's will be private. All offices are formed by Hauserman steel partitions, which can be changed if necessary. Clear-glass windows in each office give the office section an open look. The office ceilings are of acoustic Celotex blocks.

The building, which will cover 12,500 square feet, will devote about 25 per cent of its space to display, and a similar amount to offices; 6,000 square feet are set aside for parts bins and supplies. The shops at the north end of Van Keppel's 1¼-acre lot are adjacent to a switch track and have about 4,000 square feet. Van Keppel's and the Carter-Waters properties will meet under the viaduct which separates the two buildings.

It was 20 years ago when Van Keppel rented about 5,000 square feet of space in the Carter-Waters Building at 2440 Penway. In all that time, neither Van Keppel nor A. R. Waters has ever had a lease contract. A lawyer drew one up for the two men originally, but neither could understand it so they tore it up and shook hands over the deal.

Van Keppel, Past President of the Associated Equipment Distributors in 1944, is as happy as a child with a new toy. "Look at all this room!" he said. "We'll really be able to take better care of our customers now. And I'm going to be hard as a top sergeant about that yard outside when we get it all graded and fixed up."

One of the problems which Van Keppel solved was that of parts bins. His parts bins are 7 feet high. The cross beams were set to give at least 14 feet of clearance from the floor, so two parts bins could be placed together if necessary.

Many of the parts bins were moved without taking out the parts. Plywood panels were placed over the bin fronts and fastened with metal tape, and the entire bins were then moved over to the new location.

Rubbish Disposal Demonstrated

Cooperating with the Kansas State Board of Health, several equipment distributors of the Missouri-Kansas area demonstrated cut-and-cover rubbish disposal during the month of June. Four demonstrations were made at Dodge City, Wichita, Parsons, and at Kansas City. The demonstrations, arranged for and publicized by the State Board of Health and Kansas University, were part of a long-range public-education program to eliminate pollution of Kansas streams.

According to James R. Wackley of Couch Tractor & Equipment Co. in Kansas City, Mo., three principal equipment combinations were demonstrated. His company furnished an International TD-14 with a Drott Bullclam. Allis-Chalmers distributors furnished an HD-5 with a Tracto-Shovel, and Cater-

(Continued on next page)

Now Better than Ever
BEAVER Model-A
Pipe and Bolt Machine

Safe! Smoother!

Two new improvements—patents pending—have been added to further increase the safety, convenience and performance of the Beaver Model-A ⅛ to 2" Pipe & Bolt Machine—popular the world over for the past 19 years.

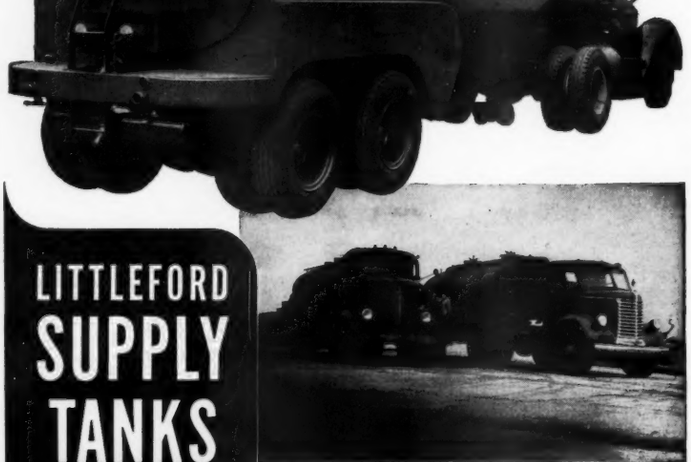
1. The new Automatic Switch Lock and Chuck Wrench holder makes it impossible to start the machine without removing the chuck wrench. This protects both workmen from injury and machine from damage. A highly important Safety Feature.
2. The new Eccentric Spool Pipe Centering Device is detached from the rotating spindle—prevents the whip of long revolving lengths of pipe from rocking the spindle and causing flat-sided, leaky threads.

And don't forget—there are 192 different kinds and sizes of dies available, in stock, for your every requirement when you buy a Beaver Model-A. This die inventory represents an investment of more than $150,000—to insure immediate user service. Sold by leading jobbers—

Write today for the new Beaver Catalog No. 51

51 Years of Friendly Service

BEAVER PIPE TOOLS



LITTLEFORD SUPPLY TANKS

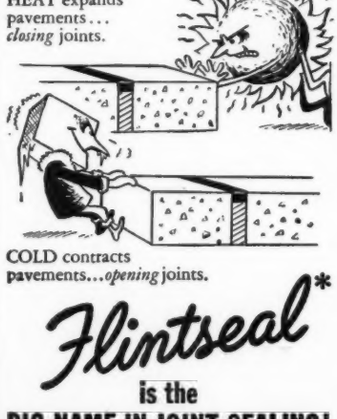
To transport hot or cold bituminous materials

When those Bituminous Distributors are constructing or repairing a highway, Littleford Supply Tanks bring the Bituminous Materials right to the job. These Supply Tanks dash back and forth from the source of supply to feed the spraying equipment so they will not have to stop—this eliminates costly delays and saves you money. Littleford Supply Tanks are made to haul hot or cold materials; heating systems together with pumping units are available. These Supply Tanks are made in Semi-Trailer, Truck Mounted or Four-Wheel Trailer Models. Semi-Trailer Units are made with the Frameless Constructed Self-supporting Tank. Sizes range from 2000 to 5500 gallons.

Write for Bulletin No. 25

LITTLEFORD
LITTLEFORD BROS., INC. 485 E. Pearl St., Cincinnati 2, Ohio

Where weather extremes meet...



Flintseal* is the BIG NAME IN JOINT-SEALING!

Mile after mile of Flintseal highway joints prove that this *rubber asphalt thermoplastic* joint-sealing compound has well earned its great reputation!

Engineers and contractors now know that concrete pavements, joint-sealed with Flintseal, last years longer than when ordinary materials are used.

Flintseal adheres tenaciously, does not lose bond at low temperature or flow in hot weather . . . remains extensible and compressible through complete cycles of expansion and contraction of the concrete.

Specify Flintseal Hot-poured Joint-sealing Compound
(Fed. Spec. SS-F-336a)

You will obtain more trouble-free mileage of concrete pavements by specifying Flintseal . . . the big name in joint sealing.

Write for Free, illustrated, descriptive Booklet

Complete technical data and specification procedures are available also upon request.

THE FLINTKOTE COMPANY
Industrial Products Division
30 Rockefeller Plaza
New York 20, N. Y.

FLINTKOTE
Products for Industry

*Reg. U. S. Pat. Off.

Distributor Doings

(Continued from preceding page)

pillar dealers furnished a D4 with a Traxcavator front-end loader.

Invitations to the demonstrations went to city officials in all Kansas towns with a population of 4,500 or over, and included invitations to a free noon luncheon, furnished by the distributors. The distributors who participated included Martin Equipment Co. of Topeka, Newlin Equipment Co. and Hobson Equipment Co. of Kansas City, and the Couch Tractor & Equipment Co.

Demonstrating new uses for equipment is nothing unusual for any of the distributors involved. The Couch organization was recently called in to suggest methods for boosting output and lowering equipment cost in the lead mines at Joplin, Mo. The firm dismantled and reassembled a 4-wheel Hough Payloader after the parts had been taken underground down a mine shaft at Billharz Mining Co. at Baxter Springs. Two International-TD-9-mounted Lodover shovels were installed at the Eagle-Picher mines in Joplin. Both installations were highly successful and solved bad problems. Tractor grousers wore out in 4 months when conventional front-end loaders were used, but the Lodover-type shovel increased that life to 7 months.

The Kansas demonstration was successful, according to Wackley, and city officials believe that many a Kansas town will soon initiate better garbage and debris-disposal programs.

I-H Dealer Is Civic Leader

Many towns and cities throughout the country are struggling with plans for increased recreational facilities. The spread between large plans and small funds is often too much for the community to handle, and projects remain on the drawing boards. In Bluefield, W. Va., however, the problem was neatly solved when the construction industry took the lead by sending its forces into the gap at no charge to the city.

Biggest job was scooping out a site for a swimming pool and shearing off a mountaintop back of it for a picnic and recreational area in a city park. Led by Roy Hill, manager of Rish Equipment Co., International Harvester industrial distributor, a dozen earth-moving contractors and coal strippers put their bulldozers, shovels, and trucks to work in a mass 3-day attack on the project.

Bluefield's mayor, W. L. Thornton, opened the show by firing a pistol, and an armada of earth-moving equipment made the dirt fly while crowds of sidewalk superintendents looked on. By that time, everybody wanted to get into the act. Women of the local garden clubs set up a mobile kitchen and supplied the workers with food donated by Bluefield merchants. Oil companies poured barrels of free fuel and lubricants into the machines to keep them working at top speed. Eight retail lumber yards built nearly fifty picnic tables and benches for the area. Prodded by an offer from the electricians to do the wiring if someone would furnish materials, wholesale houses are talking seriously about donating steel, plumbers about giving and installing necessary pool equipment, and the carpenters' union is considering building the forms. City officials have estimated that the earth-moving work alone would have cost more than $75,000.

Just after noon on the third day, the contractors and coal strippers, hugely enjoying their spotlighted role, assembled their equipment into a parade. Led by a hastily summoned high school band, they toured the city streets in celebration. The Rish Company, as prime mover of the show, played host to the workers at a banquet that evening.

A parade of construction machinery tours the streets of Bluefield, W. Va., to celebrate completion of an earth-moving project which included scooping out a large swimming pool and grading a park site. Organized by the Rish Equipment Co., a dozen contractors pooled their men and machines and donated the job to the city.

Nordberg Appoints Three Dealers

Appointment of three new distributors for Nordberg 4FS diesel engines is announced by Nordberg Mfg. Co.,

(Continued on next page)

Vulcan Tools

Rock Drills, Pavement Breakers and Clay Diggers.

Vulcan Tool Manufacturing Co.

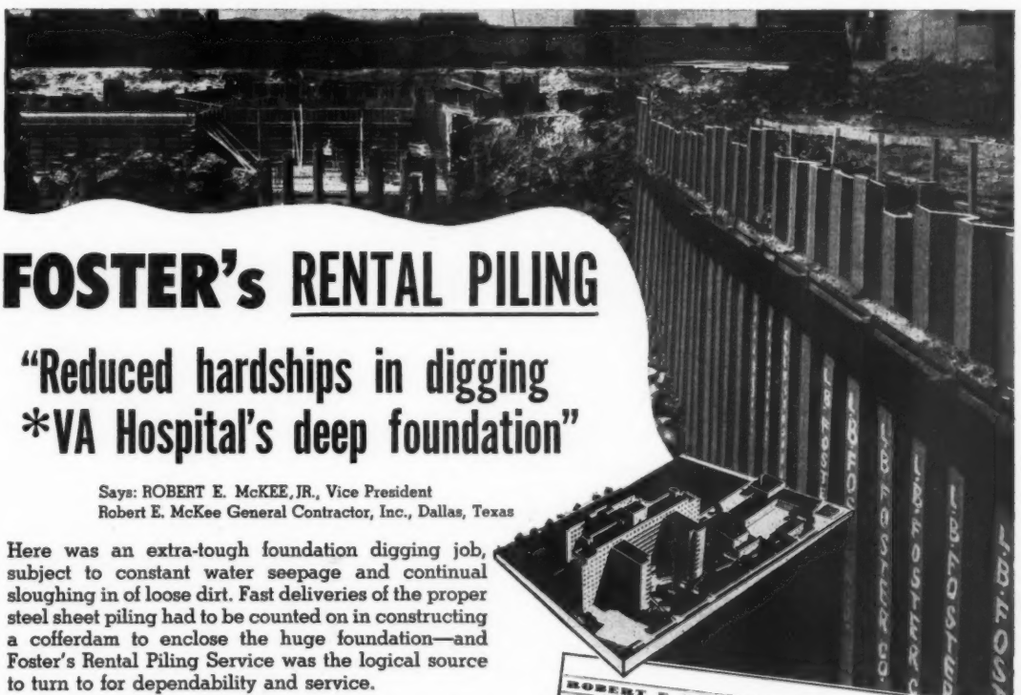
55-42 Liberty Street, Quincy 69, Mass.

Branch Offices and Warehouse Stock.

74 Murray St. 34 No. Clinton St.

New York 7, N. Y. Chicago 6, Ill.

Send for catalog or see your local distributor.



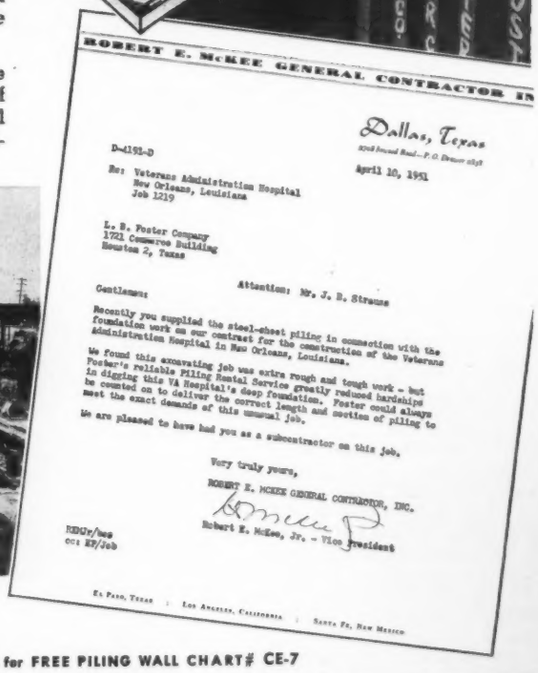
FOSTER's RENTAL PILING

"Reduced hardships in digging *VA Hospital's deep foundation"

Says: ROBERT E. McKEE, JR., Vice President
Robert E. McKee General Contractor, Inc., Dallas, Texas

Here was an extra-tough foundation digging job, subject to constant water seepage and continual sloughing in of loose dirt. Fast deliveries of the proper steel sheet piling had to be counted on in constructing a cofferdam to enclose the huge foundation—and Foster's Rental Piling Service was the logical source to turn to for dependability and service.

Foster offers no magic formula to fit every job site . . . but a complete warehouse stock consisting of every length and every section of interlocking steel sheet piling in every standard make—always available for prompt shipment.



ROBERT E. McKEE GENERAL CONTRACTOR IN

Dallas, Texas

April 10, 1951

D-4191-D

Re: Veterans Administration Hospital
New Orleans, Louisiana
Job 1219

L. B. Foster Company
1721 Commerce Building
Houston 2, Texas

Attention: Mr. J. B. Strauss

Gentlemen:

Recently you supplied the steel-sheet piling in connection with the foundation work on our contract for the construction of the Veterans Administration Hospital in New Orleans, Louisiana.

We found this excavating job was extra rough and tough work - but Foster's reliable Piling Rental Service greatly reduced hardships in digging this VA Hospital's deep foundation. Foster could always be counted on to deliver the correct length and section of piling to meet the exact demands of this unusual job.

We are pleased to have had you as a subcontractor on this job.

Very truly yours,

ROBERT E. McKEE GENERAL CONTRACTOR, INC.

Robert E. McKee, Jr. - Vice President

REMJr/mes
cc: KF/Job

El Paso, Texas | Los Angeles, California | Santa Fe, New Mexico

*The New Orleans Veterans Administration Hospital being constructed by the New Orleans, District of the Corps of Engineers under District Engineer Col. Chas. G. Holle. Favrot, Reed, Mathes & Bergman of New Orleans and Faulkner, Kingsbury & Stenhouse of Washington, D.C. are the architects.

This new 10-story VA hospital is being built at a cost of approximately $9,000,000. Work got under way in September 1949 and is scheduled for completion sometime in January 1952.

Send for FREE PILING WALL CHART# CE-7

RAILS • TRACK ACCESSORIES • PIPE • WIRE ROPE • STEEL PLATE

RENT: Pile Hammers and Pile Extractors

L. B. FOSTER CO.

PITTSBURGH 30, PA. CHICAGO 4, ILL. NEW YORK 7, N.Y. HOUSTON 2, TEX.

Distributor Doings

(*Continued from preceding page*)

Chase & Oklahoma Aves., Milwaukee 7, Wis.

The new distributors and their assigned territories are: Houston Engine & Pump Co., 1939 St. Bernard St., Houston 1, Texas (Gulf Coast of Texas and territory within a 100-mile radius of Houston, Texas); O'Keefe Motors, Inc., 403-15 Samuel St., Trenton, N. J. (northern half of New Jersey); and Midwest Utilities Power Equipment Corp., 1270 Augusta Blvd., Chicago, Ill. (northeastern Illinois, Indiana, and western Michigan).

Nordberg 4FS diesel engines are built in 1 and 2-cylinder models with a power range from 10 to 30 hp for stationary or portable applications.

Townsco Sold to Butler & Sparks

Change of ownership of Townsco Equip Co. 1700 N.W. Sixth St., Oklahoma City, Okla., has been consummated. G. L. Townsend and associated stockholders have sold the business to E. A. Butler and Reuben Sparks. Both Butler and Sparks have had long experience in the construction and contractors equipment business. Butler recently sold his one-third ownership in the Southwest Machinery Co.; Sparks was previously service and parts manager for Southwest.

Under the new ownership, Townsco Equip Co. plans an extended coverage, with expanded personnel, for the entire state of Oklahoma. R. J. McCulloch, Manager of the Heavy Equipment Department, and Claude J. White, Manager of the Tulsa Branch, will continue with Townsco in the same capacities.

Mr. Townsend will carry on with the Townsco Contracting Co. Its headquarter offices are in the Cravens Bldg., Oklahoma City. This company deals primarily in specialized airfield reflectory marking and striping work and also in cleaning and resealing expansion joints in airport concrete runways, aprons, etc.

Cleco Names Thirteen Dealers

The Cleco Division of the Reed Roller Bit Co., Houston, Texas, has added thirteen dealers to its list: Keystone Builders Supply Co., Inc., Rochester, N. Y.; Pit & Quarry Equipment Co., Indianapolis, Ind.; Hays Supply Co., Memphis, Tenn.; Vogl Tool Co., Kansas City, Mo.; R. D. Price Associates, Springfield, Mass.; The Ridley Co., San Francisco, Calif.; A. J. Baxter & Co., Detroit, Mich.; Gesner Equipment Corp., New Haven, Conn.; Dawson Tool & Abrasive, Inc., Seattle, Wash.; Cohen Auto Parts, Inc., Erie, Pa.; Franklin Supply Co., Providence, R. I.; J. Heller & Sons, Inc., Newark, N. J.; and Somerset Pneumatic, Inc., Somerville, N. J.

These companies will handle the complete lines of Cleco and Dallett air tools and accessories.

Allis-Chalmers Opens New Branch

Latest milestone in Allis-Chalmers' expansion in the South is the opening of a new factory branch at 4646 Peachtree Blvd., Atlanta (Chamblee), Ga. It will serve industrial dealers in South Carolina, Georgia, Alabama, and Florida; agricultural dealers in Georgia, Alabama, Florida, and eastern Tennessee.

Set on 8 acres of ground, the new offices were planned after a wide study of branch buildings and facilities. It is designed for the use of fork-lift trucks and a conveyor system to speed the packaging of repair parts. The modern, one-story structure has 60,000 square feet of floor space, plus 8,000 square feet of docks for trucks and rail shipments. Also included are 2 acres of outside paved and fenced area for parking and special machinery handling.

Members of the Atlanta organization include: E. H. Polzin, Manager; E. A. Conwell, Assistant Manager; Frank Young, Agricultural Sales Manager; and Claude M. Evitt, Industrial Sales Manager.

More than 350 dealers, territory salesmen, and company executives viewed the new facilities and shared a noon barbecue on June 21.

Policies and People at Bemiss

Policy and people govern the growth of almost any business. Perhaps, as pointed out in a recent issue of *The Virginia Road Builder*, this applies particularly to a construction-equipment business such as Bemiss Equipment Corp. Over the past 16 years, sound policy directed and applied by hard-working people has earned for Bemiss a good reputation, loyal customers, and cash in the till.

Starting back in 1936 with six employees, the small company has grown through the years to be one of Virginia's leading distributors. Under the direction of its founder, S. Merrill "Chick" Bemiss, the company now has a total of 75 employees working at the

(*Continued on next page*)

New FORM TIE development

HEX-LOCK—SINGLE-UNIT

This HEXLOCK Clamp has a floating nut locked in place. This permits greater ease of operation, due to the fact that you are turning metal on metal instead of metal on wood. This Clamp can also be used directly with our Vibra-Lock Clamp in cases where walls may have a steep batter on one side only. All our clamps employ Super-Hi Tensile Inner Rods, which permit faster pouring with a known factor of safety. *Write for Circular.*

Also use — Williams Super-Hi Tensile Tire Rods, Couplings, Pig-Tail Anchors, Form Aligners, Corner Clamps, Waler Supports, and Assembly Motor Units.

WILLIAMS FORM ENGINEERING CORPORATION

1501 Madison Ave., S.E., Grand Rapids 7, Mich.

HERE'S WHAT USERS SAY ABOUT THE DEMPSTER-DIGGSTER—

"IT'S THE FASTEST, MOST EFFICIENT EXCAVATING TOOL I HAVE USED"

—A. J. METLER, *Contractor*

"During the past several years," Mr. Metler says, "I have owned and operated four conventional full revolving crawler and truck mounted shovels and cranes and know that they have a direct application to many types of excavating work.

"On the other hand, I have learned that the fast operation of the tricycle mounted Dempster-Diggster permits it to be used on certain types of work to a considerable advantage. Its mobility permits quicker transfer from one job to another.

"I have had excellent results from the Dempster-Diggster and consider it the fastest and most efficient excavating tool I have used."

Mr. Metler is one of the many contractors who has found the Dempster-Diggster to be "the fastest and most efficient excavating tool" available.

This speed and efficiency in excavation work is accounted for, mainly, by the Diggster's exclusive independent hydraulic crowd and hoist action, its hydraulic steering and wheel-type traction.

The power crowd permits bucket to keep digging until loaded . . . no digging with wheels. The hydraulic steering gives the driver sensitive, easy, finger-tip control. When accelerated, a one-handed twist of the steering wheel puts the machine in any desired position. By operating on rubber-tired wheels, the Diggster, of course, can move at the fastest possible speed on the job and to and from jobs.

The Type HL Dempster-Diggster is equipped for extraordinary high dumping. The bottom of bucket is 13 feet six inches above ground.

HERE IS THE NEW TYPE HL DEMPSTER-DIGGSTER shown excavating with a 1¼ cu. yd. (heaped) digging bucket. The Type HL Dempster-Diggster will dig through an 18 foot bank while the Type GRD digs through a 15 foot bank.

The Dempster-Diggster is a "must" for contractors, large or small operators alike.

The Dempster-Diggster has a 15 foot turning radius, is 20 feet long when bucket is in traveling position, and is nine feet and six inches in height.

Four standard interchangeable buckets of two types are available. Digging buckets with four bottom teeth in 1 and 1¼ cubic yard (heaped) capacities, and materials handling buckets in 1½ and 2 cubic yard (struck) capacities.

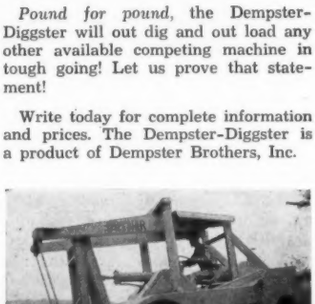
For fast, efficient operation in difficult terrain, the Diggster is available with crawler-type traction.

"I have not personally used the Dempster-Diggster mounted on crawler treads," Mr. Metler said, "but have seen it in operation on jobs adjacent to mine. I know it is a very effective tool and has many applications."

Construction men have found that on big jobs the Dempster-Diggster has no equal for working in tight places and for freeing big shovels for heavier work. The Diggster has an 8 foot 10 inch crowing reach, will dig through a 15 foot bank, and will dig 15 inches below grade.

Pound for pound, the Dempster-Diggster will out dig and out load any other available competing machine in tough going! Let us prove that statement!

Write today for complete information and prices. The Dempster-Diggster is a product of Dempster Brothers, Inc.



This is the type GRD Dempster-Diggster, which Contractor A. J. Metler considers "the fastest and most efficient excavating tool I have used." It is shown digging 15 inches below grade.

DEMPSTER DIGGSTER

DEMPSTER BROTHERS

481 SHEA BUILDING

KNOXVILLE 17 TENNESSEE

The main office of Bemiss Equipment Corp. at 2219 Chamberlayne Ave., Richmond, Va.

Richmond home office and the Roanoke branch.

The modern plant layout at 2219 Chamberlayne Avenue includes a large office, showrooms, a parts storage room and an inventory-control room to go with it, an engine overhaul shop and general shop, a cleaning and painting room, an injector repair room, and a general yard for the storage and display of large machines.

A perpetual-inventory system keeps tab on every item moving in and out of the parts department. Functioning smoothly under the direction of Parts Manager G. L. Tremearne, the system gives an exact accounting of all parts and, as Tremearne says, "keeps us from telling a customer we have it, when it is already sold".

The engine shop at Bemiss is designed for the complete overhaul and rebuilding of GMC diesels. A recent addition to the shop is a Bennett-Feragen dynamometer which checks each motor under load and shows the mechanic that the speed, horsepower, and over-all efficiency of the engine are up to rating.

A fleet of well equipped trucks gives the Bemiss Service Department an enviable record. Each unit is manned by a trained service mechanic always available on call when a customer needs help. These men are factory-trained and field-experienced so as to minimize the time necessary to spot trouble, repair a machine, and get it back on the job in full working order.

All the "old hands" at Bemiss have had many years of experience in the field. The official family includes Mr. Bemiss himself; "Bill" Coleman, V. P. and General Sales Manager; John A. Clarke, Secretary; C. H. Waal, Treasurer; Barton Porter, General Service Manager; and T. Sudderth, Roanoke Branch Manager. Working together as a well knit, smoothly functioning team, the group looks forward to many more years of service to the construction industry.

Five G-E Welding Distributors

The General Electric Co., Schenectady, N. Y., has named five distributors. Welding Engineering & Equipment Co., Syracuse, N. Y., will serve New York State from Poughkeepsie west to Geneva. Welding Sales Corp. of Newark, N. J., is covering eastern and northern New Jersey, the metropolitan area of New York and Long Island, and New York State north as far as Poughkeepsie. Welding Equipment Sales Co., Buffalo, N. Y., is handling the New York State territory west of Geneva. These three distributors have the territory formerly allotted to Welding Engineering Sales Corp. of New York City.

Alabama Oxygen Co. has been appointed to handle the sale of G-E welding equipment in the Birmingham area. Odland Iron Works, Toledo, Ohio, has established a separate sales organization to distribute G-E welding equipment in the Toledo area.

El Paso Dealer Enlarges Building

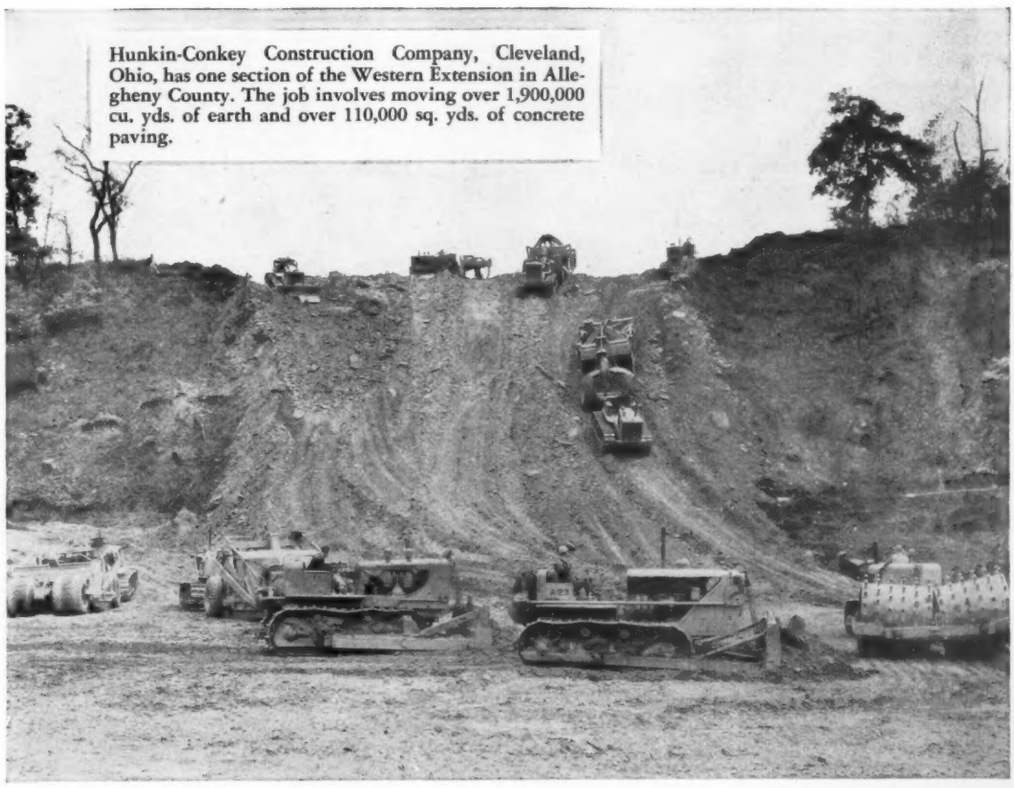
Enlargement of office and stockroom facilities is currently under way by Equipment Supply Co. at El Paso, Texas, equipment distributor for the southern third of New Mexico and for Texas, west of the Pecos River. Such well-known names as Allis-Chalmers, General Motors (diesel engines), Gar

(Continued on next page)

Bemiss personnel do some planning. Seated, left to right, Bill Coleman, John Clarke, Chick Bemiss, and C. H. Waal. Standing, G. L. Tremearne and Barton Porter.

GULF PRODUCTS *and* **FINE SERVICE**

keep equipment rolling on Western Extension of the Pennsylvania Turnpike



Hunkin-Conkey Construction Company, Cleveland, Ohio, has one section of the Western Extension in Allegheny County. The job involves moving over 1,900,000 cu. yds. of earth and over 110,000 sq. yds. of concrete paving.

THE Western Extension of the Pennsylvania Turnpike is another big and important project where the majority of contractors rely on Gulf to help keep equipment delivering top performance.

Leading contractors, like Hunkin-Conkey Construction Company for example, know from experience that Gulf quality lubricants provide an extra margin of protection against mechanical delays. And that Gulf fuels insure full engine power and efficiency.

Then, too, they appreciate the engineering counsel Gulf provides to assure the most suitable lubricants and fuels for every unit and operating condition. And Gulf's prompt delivery service.

Let us discuss with you how Gulf products and services can help you on your next job. They are available to you through more than 1200 conveniently located warehouses. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh, Pennsylvania.

FIFTY YEARS OF SERVICE 1901 GULF 1951

PETROLEUM AND ITS PRODUCTS

EXPERT REPAIRS All Makes USED INSTRUMENTS Bought and Sold

J. H. WEIL & CO.

1325 CHERRY ST., PHILADELPHIA, PA.

GURLEY DISTRIBUTORS

Distributor Doings

(Continued from preceding page)

Wood, Worthington, Insley, CMC, and Schield-Bantam are featured on the company's account roster.

Three years ago, R. G. (Bob) Folk, President of Equipment Supply Co., looked ahead and purchased a 2¼-acre plot of ground ideally located at 1600 East Paisano Drive. The property now fronts on a new truck expressway recently built through the city, and much better access and parking will be possible at the new site.

The enlargement of facilities has been done piece by piece, and the property now contains a tractor-repair shop, heavy-equipment repair shop, and a parts and storage area. E. E. Petty, El Paso contractor, has the front addition of the new office and display building under construction.

As completed, the new facilities will include a 70 x 30 foot showroom, office space measuring 70 x 30 feet, and the remainder of a general 70 x 180-foot area devoted to storeroom space. Plastic skylights in the aluminum roof over the stockroom area will generally eliminate the necessity for electric lighting in the daytime. The building will have metal siding and an attractive showroom front.

A mushrooming agricultural program in the Rio Grande Valley is placing almost as much pressure on Equipment Supply Co. as its contractor-construction demand. Farmers in the rich valley are getting more and more pump and engine equipment through the company, which is now investing private funds to enlarge facilities to meet that need.

When the Paisano Drive enlargement is finished a year hence, Folk expects to move office and other facilities now at 118 South Campbell St. to the new location.

J. D. Evans Equipment Co. of Sioux Falls, S. Dak., sold these nine Lull 4-A Shovel-loaders to the South Dakota State Highway Department. They are mounted on Minneapolis-Moline RT1 tractors.

Two Join St. Louis Dealer

Missouri-Illinois Tractor & Equipment Co., St. Louis, Mo., announces the appointment of Herman C. (Joe) Kaller and Charles Krausnick as Sales Representatives assigned to the Missouri territory.

Joe Kaller makes his headquarters at Jefferson City. His experience, prior to his new association, included employment with the Missouri State Highway Department and small construction firms. Both Kaller and Krausnick are experienced in all phases of the construction equipment business, having spent the requisite period as sales trainees for Missouri-Illinois before assignment to their respective territories, the company says.

Two New Distributors for Heil

Two new distributors have been appointed by The Heil Co., 3000 W. Montana St., Milwaukee, Wis. The A. R. Statler Body Co., Marion, Pa., will sell Heil bodies and hoists. This company's work is almost entirely confined to the building of specialty truck bodies.

Harold L. Ayers, Middletown, N. Y., will market Heil dozer blades. This firm has over 8,000 square feet of shop and display area in a one-story plant on a main highway just outside the city.

To Contact Rubber-Goods Dealers

Richard W. Sabine, former senior staffman in charge of mechanical-goods advertising and sales promotion for Goodyear Tire & Rubber Co., Akron, Ohio, has been named Manager of Distributor Sales in the company's Mechanical Goods Division. He succeeds W. T. Bell, who died recently.

Eagle Dealer on the Coast

Coast Equipment Co., San Francisco construction and industrial machinery

(Concluded on next page)

Economical one-man operation and low air consumption are secured when the CP-219 PNEUMATIC CONCRETE VIBRATOR is used for concrete 3" slump and over, and for walls and columns under 15" thick.

With a choice of seven different models of CP Pneumatic and Electric Vibrators, just the right vibrator can be selected for any specific job.

For especially heavy tamping the easy-to-handle No. 4 Ring Valve BACKFILL TAMPER is recommended. Other models available for heavy or average work.

MEETS DEMANDS OF TOUGHEST JOBS

In the world's largest line of DEMOLITION EQUIPMENT there is a CP tool for every type of demolition work. Five models range from the lightweight CP-111 (25 lb. class) to the heavy-duty CP-117 (80 lb. class).

CP PORTABLE COMPRESSORS incorporate four outstanding advantages: dependability, minimum operating cost, low maintenance, long service life. Gasoline and Diesel driven models are available from 60 to 600 cfm.

Write for detailed information.

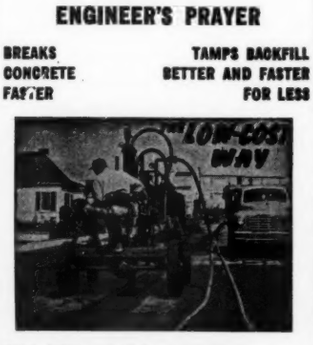
CHICAGO PNEUMATIC TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

THE ANSWER TO THE ENGINEER'S PRAYER

BREAKS CONCRETE FASTER

TAMPS BACKFILL BETTER AND FASTER FOR LESS



THE NEW, MORE POWERFUL
MIGHTY "B" MIDGET

Fastest Pneumatic Concrete Breaker and Backfill Tamper. Replaces all the dirt removed after pipe has been laid.
Gives you high density compaction. Ready to repave immediately. No temporary paving. No spoil dirt to haul away. Due to high density compaction, requires little asphalt in replacement. Cuts cost of tamping and breaking of concrete many times. Can be worked manually or automatically. 160′ Compressor for full capacity or 105′ Compressor for ½ capacity.
For further particulars, see your nearest dealer, or write Department C.

R. P. B. CORPORATION
2751 East 11th Street . Los Angeles 23, California

Distributor Doings

Continued from preceding page

distributor, is an exclusive sales and service representative for Eagle Iron Works, Des Moines, Iowa. The Eagle line includes sand and gravel washing equipment, breaker balls, drop pile hammers, line weights, and the Swintek dredging ladder.

Thor Reception at Mark Hopkins

The Independent Pneumatic Tool Co., Aurora, Ill., maker of Thor products, gave a reception for its distributors and their wives in the famous "Top O' the Mark" lounge at the Mark Hopkins Hotel in San Francisco. The reception was a part of Thor's program for the National Industrial Supply Convention held in San Francisco, June 11-13.

Huber Distributor in Mississippi

Huber Mfg. Co., Marion, Ohio, has appointed Equipment, Inc., its distributor in the southern half of Mississippi. The Jackson dealer firm will handle Huber's line of rollers, graders, and maintainers in a territory which extends south from Highway 82 to the Gulf Coast. J. J. Schmelzer, Jr., is President of Equipment, Inc., and Leonard R. Clark is Vice President.

Cellulose Oil Filter

An oil filter which uses molded cellulose fibers has been developed by The Briggs Filtration Co., Washington, D. C. The bonded agent is applied to natural cellulose materials which are formed, under pressure, into "cartridges" or blocks. The size of the fibers controls the porosity of the block. The blocks are then stabilized by a series of thermal processes which fix the finished dimensions. They are said to be impervious to water and to retain their original dimensions in use.

The company reports that the new medium has a high dirt retention and that there is no "unloading" action between filtration cycles. Complete filters and replacement cartridges are available for standard makes of automobiles, trucks, and heavy equipment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 549.

Trailmobile News

L. F. Manneschmidt is managing the used-trailer department of The Trailmobile Co., Cincinnati, Ohio. This new department is responsible for information on used-trailer values in various sections of the country and for trailer inventories in the company branches. Mr. Manneschmidt was previously District Manager for the Charlotte, N. C., branch of the company.

Bituminous DISTRIBUTORS with Original Rosco Features

For over 20 years, we've pioneered features that are now universally accepted . . . Automatic Pressure Metered application . . . patented V-Jet nozzles . . . folding safety spraybar. These are features that will save you money on the job. Write for literature.

ROSCO MINNEAPOLIS ROAD OIL DISTRIBUTORS STREET FLUSHERS and CLEANERS • MAINTAINERS

ROSCO MANUFACTURING COMPANY
3124 Snelling Ave. • Minneapolis 6, Minn.

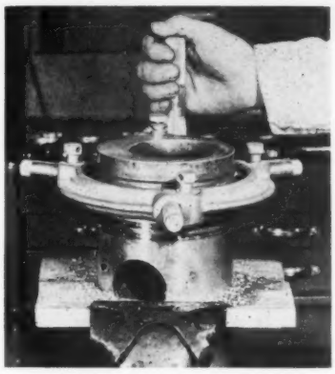
Regrooving Pistons For Prolonged Life

With material for new machines and replacement parts in short supply, methods for prolonging the life of parts to keep machines operating is becoming increasingly important. Many parts, seemingly worn out, must now be salvaged. A conservation program in progress at Caterpillar Tractor Co., Peoria 8, Ill., encourages the regrooving of diesel-engine pistons. This is said to double their life.

The point of greatest wear on a piston is the top ring groove. If the piston is otherwise sound, remachining the groove for a "wide" top ring can give many additional hours of life to the piston, the company says. "Wide" piston rings are now available for all Caterpillar diesel engines with the exception of the new V-type engines. The factory at this time does not recommend regrooving of pistons for these particular engines.

The regrooving is accomplished either by turning the piston on a very accurate engine lathe, or by performing the job with a precision hand-operated tool known as the Manulathe. The latter is said to provide an accurate and fast method of regrooving pistons. It will produce results equal to those obtainable on the best engine lathe, and is equally adaptable to all-aluminum as well as cast-iron insert-type pistons, Caterpillar says. The tool consists of a cast ring with three locating pins and a carboloy cutting tool. The cutting edge is fed into the work with each revolution of the Manulathe about the piston. The tool is accurately located on the piston and the rate of feed is constant.

By having pistons regrooved, using either an engine lathe or the Manulathe, savings in material and new parts cost are achieved. The company points out that Caterpillar dealers are equipped with the necessary tools and skill to do this job properly.



A Manulathe in position, ready for regrooving a piston in the research department of Caterpillar Tractor Co.

Handles Joyce Exports

The export activities of the Joyce-Cridland Co., Dayton, Ohio, designer and builder of lifting equipment, are being handled by Borg-Warner International Corp., Chicago.

P&H DIESEL ENGINES

2-CYCLE

Almost any part FITS THEM ALL!

• Think how that cuts your costs . . . simplifies parts stocking . . . speeds up service. 80% of *all* parts fit *all* P&H Diesels—1, 2, 3, 4, and 6-cylinder models. For example, the standard cylinder and liner assembly can be replaced in *any* P&H Diesel in only 40 minutes. You don't even drop the pan. Greater interchangeability is one more reason you should standardize on P&H Diesels. Available in bare engines, power units and generator sets. Write for literature, Diesel Division, Harnischfeger Corporation, Port Washington, Wisconsin.

P&H DIESEL DIVISION
HARNISCHFEGER CORPORATION
PORT WASHINGTON WISCONSIN, U. S. A.

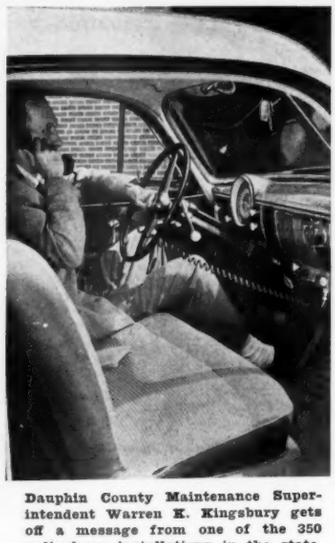
Highways on the Air

After several years of experimentation with high-frequency radiotelephone communications, the Pennsylvania Department of Highways has installed a state-wide network to be used during snow and ice storms, floods, and other disasters. Its most important use will probably be for directing the transfer of snowplows.

The central station is on top of Dauphin Mountain near the State Police transmitter. There are 350 receivers and transmitters in the net and the Federal Communications Commission has given the Department permission to expand the system to 650 stations.

County maintenance superintendents have fixed stations in their offices and mobile units have been installed in the equipment operated by each county superintendent, assistant county superintendent, and garage foreman. The automobiles of the district engineer, maintenance engineer, and district mechanic also have mobile transmitters and receivers. The Assistant Chief Maintenance Engineer and the Assistant Maintenance Engineer of the Department have units in their automobiles.

This building houses the radiotelephone transmitting and receiving equipment of the Pennsylvania Department of Highways and the State Police.



Dauphin County Maintenance Superintendent Warren K. Kingsbury gets off a message from one of the 350 radiophone installations in the state.

In one of the 66 land stations—one for each county—Assistant Program Engineer John P. Henry is delivering the message picked up by Kingsbury.

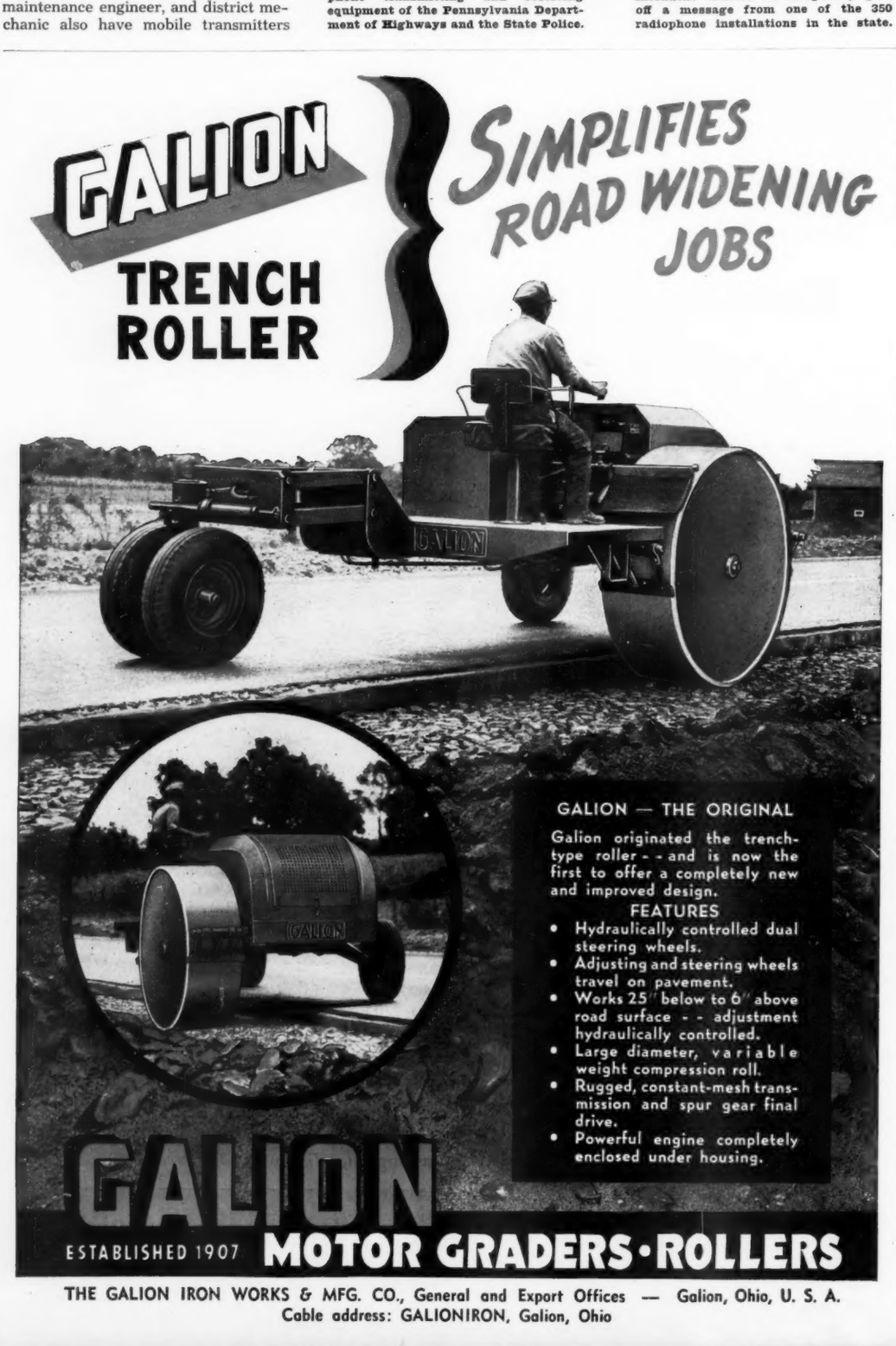
The network operates on a frequency-modulated wave of 47.30 under the general call letters KGB with numerals added to designate the different stations. It is under the direction of N. A. Staples, Chief Maintenance Engineer, with headquarters in Harrisburg. The equipment was leased from Bell Telephone Co. and Raymond Rosen Co.

Arc-Welding Instructions

"New Lessons in Arc Welding", a book containing 61 welding lessons plus 163 pages of welding information, has been published by The Lincoln Electric Co. The material is based on the lessons and instruction given at the Lincoln Arc Welding School.

The lessons are practical and cover basic and advanced welding in alloys, sheet metal, and pipe. A list of practice materials, exercises, questions, and answers are given for each lesson. A welding application section explains the latest welding procedures for fast and low-cost welding, and for automatic and semiautomatic hidden arc welding. It discusses metals and means of identifying them, the selection of correct welding joints, and ways of using welding instead of casting when making common machine parts.

For a copy of the book write to The Lincoln Electric Co., 12818 Coit Road, Cleveland, Ohio, enclosing a remittance of $1.00.


GALION
TRENCH ROLLER
SIMPLIFIES ROAD WIDENING JOBS
GALION — THE ORIGINAL
Galion originated the trench-type roller - - and is now the first to offer a completely new and improved design.
FEATURES
• Hydraulically controlled dual steering wheels.
• Adjusting and steering wheels travel on pavement.
• Works 25" below to 6" above road surface - - adjustment hydraulically controlled.
• Large diameter, variable weight compression roll.
• Rugged, constant-mesh transmission and spur gear final drive.
• Powerful engine completely enclosed under housing.
GALION
ESTABLISHED 1907 MOTOR GRADERS • ROLLERS

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THE "Quinn Standard"
FOR CONCRETE PIPE
The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.
Quinn Heavy Duty Pipe Forms
For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.
WRITE TODAY. Complete information, prices, and estimates sent on request.
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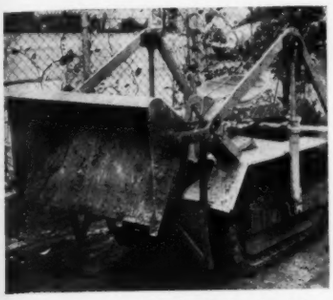
QUINN CONCRETE PIPE MACHINES
QUINN WIRE & IRON WORKS 1645-17 ST. BOONE, IA.



One of two new front-end attachments for the Agricat crawler tractor is this 4-cubic-foot bucket.

Loader and Broom For Midget Tractor

A new hydraulic-operated front-end bucket, designed expressly for the small-size Agricat crawler-type tractor, has been put on the market by Earl H. Pence & Co., Inc., 2150 Washington Ave., San Leandro, Calif. Also offered as a front-end attachment is a new rotary broom.

The 4-cubic-foot-capacity bucket, mounted on the Agricat by means of two hydraulic cylinders, is capable of displacing earth or debris from 4 inches below track level to a maximum lift height of 34 inches. The bucket trip is hand-operated and has a spring return. The operator is able to see what he is doing during all phases of his work.

The broom is attached to the Agricat on specially designed shafts, and is driven by an auxiliary 2-hp motor at speeds of from 120 to 200 rpm. It is available with either imported India-palm bristles, or with a wire brush.

With its other special attachments, each designed for a specific job, the Agricat has been used successfully in light earth-moving operations where leveling, backfilling, bulldozing, and similar work has been required, and for plowing, cultivating, harrowing, and planting.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 505.

Handy Lubrication Chart

A 26-point pocket-sized lubrication chart covering eight Hyster industrial truck models is available from the Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg. It numbers all service points of the eight models, tells when they should be serviced, and recommends the proper types of oils and greases.

Equipment featured in the chart include the Hyster-Salsbury turret-truck power unit; the Hyster 20, 40, 75 and 150 fork-lift trucks; Harry Krane; and M3 and MH3 straddle trucks.

This literature may be obtained from the company by requesting Form 1102, or by using the Request Card at page 16. Circle No. 460.

New President for Carver

The board of directors of Carver Pump Co. has elected Gordon L. Chapman President of the company and made Roy J. Carver, founder and former President, Chairman of the Board. Alexander A. Zuber, Plant Manager, has been elected a vice president and a director.

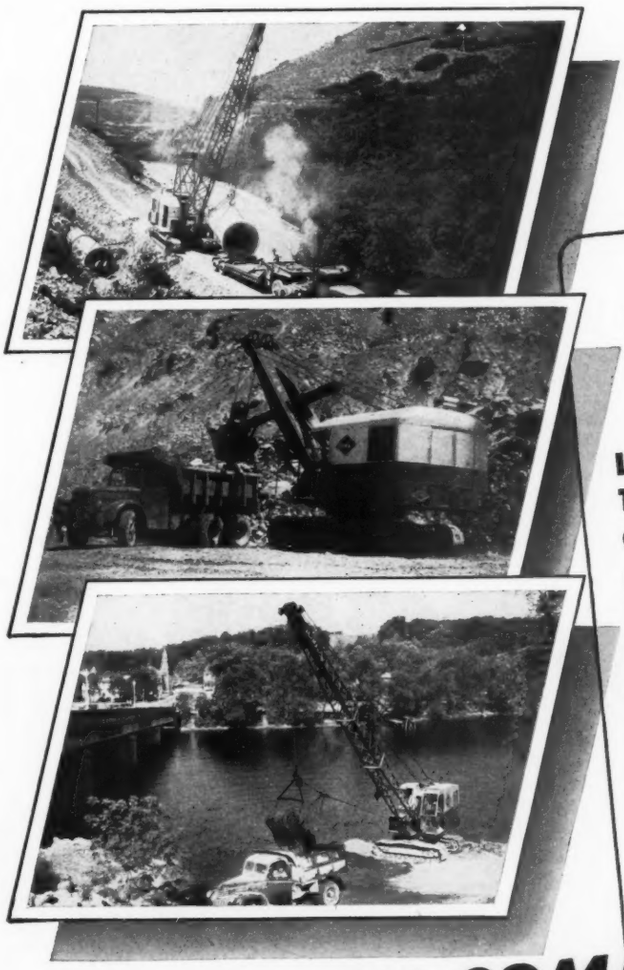
Truck Bodies and Hoists

A 4-page folder describes the complete line of truck bodies and hydraulic hoists made by Kewanee Mfg. Co., Hayward St., Kewanee, Ill. It discusses the features and applications of the hoist in detail and gives useful, specific data on its construction. Kewanee hoists are ordinarily furnished standard-coupled to give a 55-degree dumping angle for short-wheelbase trucks; and long-coupled to give a 45-degree dumping angle for long-wheelbase trucks. Lifting capacities range from 5 to 15 tons.

The folder describes the construction and gives dimensions and specifications of the contractor-type truck bodies. It also presents some special-type bodies.

This literature may be obtained from the company by requesting Bulletin No. KBH 650, or by using the Request Card at page 16. Circle No. 511.

This is Turner City—a composite view of buildings Turner Construction Co. erected in 1950 in New York, New Jersey, Pennsylvania, Massachusetts, Connecticut, Maryland, Wisconsin, and Iowa. They range from hospitals, bank buildings, and manufacturing plants to apartment houses and service stations.



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LIMA Rubber Mounted TRUCK CRANES in 20 and 35 Tons Capacity

LIMA rubber-mounted cranes offer you the added benefits of greater mobility, less travel time and better maneuverability. Rotating assemblies have the same basic features as corresponding crawler machines, with alterations adapting them to truck or wheel mounting. With outriggers supported, they provide extra capacity; are ideal for operations requiring constant movement around the job, for small scattered jobs, or remotely located.

FIRST BY COMPARISON

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Investigate LIMA shovels, cranes and draglines. See for yourself how they help you get greater production at lower cost. *Baldwin-Lima-Hamilton Corporation, Lima-Hamilton Division, Lima, Ohio, U. S. A.*

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Paver Crew Maintains Average

C. & E. M. Photos

1. Griffith men on the U. S. 99 job in California drive pins in Blaw-Knox forms with a Thor pneumatic driver powered by a Schramm portable compressor.

2. A Caterpillar No. 12 motor grader shapes a windrow for the cement treatment designed to create an erosion-resistant layer under the pavement.

3. With 3 per cent of cement injected into the windrow, a Barber-Greene traveling plant blends soil, sand, cement, and water, and deposits it back on the subgrade.

4. A Buffalo-Springfield 3-axle tandem steel roller comes after the B-G plant and gives the material its initial compaction.

5. Then a shop-built fine-grader drawn by a truck removes excess material. After final compaction and a coat of asphalt emulsion, the base is ready for paving.

6. Here's the Koehring 34-E Twinbatch paver flanked by batch and water trucks. It has dual drums and a 35-foot boom.

7. Here's a closeup, looking into the sun, of the paver which hummed at capacity on the 5-mile improvement on U. S. 99.

8. A Johnson Float Finisher puts on the fine finish, making many passes before the surface satisfies Griffith Co.

Of 1,000 Cubic Yards a Shift

California Contractor Sets a Fast Pace on PCC Pavement; Cement-Treated Subgrade Is Laid Just Ahead of Paving

By RAYMOND P. DAY,
Western Editor

• A FIREBALL paving crew, which has averaged laying 1,000 cubic yards of concrete a shift over sustained periods of time, started the 1951 construction season for the California Division of Highways on a project 25 miles north of Bakersfield, on U. S. 99. Griffith Company of Los Angeles had the 5-mile improvement job on the main north-south traffic artery, which included all work necessary to build a complete new 2-lane highway. The improvement work thus adds another 5-mile section of dual highway to that already built between Los Angeles and Sacramento.

Sparked by good organization and equipment, the work was notable largely because of the excellent rate of progress. Week after week the paving crew maintained their 1,000-yard-a-day average. The record day was 1,102 cubic yards, and since the California Division of Highways always asks its contractors to lay 12-foot strips, that record yardage carried the paver and other equipment nearly 3,600 feet. The pavement is 8 inches thick, and is not reinforced.

A General Improvement

The job was a general improvement of U. S. 99 through an area of high traffic density. Work has been under way for many years to improve the highway generally, but traffic always has a way of staying ahead of construction. A 2-lane bituminous highway served traffic through that point of the San Joaquin Valley, and after completion of the new section of portland-cement concrete, the bituminous road became the northbound lane of the divided highway. Fortunately, traffic bound both ways used this existing highway during construction, so the handling of traffic was not a special problem.

The completed section makes a limited-access freeway of the route, and its traffic-carrying capacity will be upped by approximately 150 per cent. One of the features of construction was the generous use of imported borrow material for the embankment. Approximately 240,000 cubic yards of this material was involved. It was all of a very high type. Designers, anxious to locate material with a CBR of at least 50, were gratified to see tests of 75, 80, and higher coming back on much of the imported material.

The upper 4 inches of the select subgrade were treated with 3 per cent of portland cement, primarily to create an erosion-resistant layer beneath the pavement which would be impervious to pumping under traffic. The amount of cement the California Division of Highways uses for this purpose is a variable, generally ranging from 2½ to 5 per cent, depending upon the nature of the soil, and is determined by laboratory tests. The cement-treated subgrade is given a surface treatment with liquid asphalt to provide further insurance against erosion.

The new pavement is 24 feet wide, constructed in two 12-foot lanes. With the exception of certain superelevated curves, the highway pitches on a 1 per cent fall to the west, to facilitate drainage. Shoulders 7 feet wide on both sides of the roadway complete the design picture.

Grading

Initial grading and shaping was mostly a borrow-material haul to the new location. Two main pits were designated by the State, the longest haul being about 5 miles. A Lima 1201

(Continued on next page)

C. & E. M. Photo

Two workmen of the Griffith Co. use a hand-operated device to set mastic strips for the dummy contraction joints in the pavement.

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C. & E. M. Photo

Paving went so fast on the Griffith job that the form-setting crew looked like a busy gang of "gandy dancers".

Concrete Paving Crew Maintains a Fast Pace

(Continued from preceding page)

shovel moved in to do the loading, while hauling was assigned to three bottom-dump Euclids and seven Mack trucks. Capacity on the Euclids was 13 cubic yards, while the Macks hauled about 10. It took three swings of the shovel to fill one of the trucks; four to load a "Euc".

The material was spread by bulldozer blades, and shaped by two No. 12 Caterpillar motor graders. Considerable blade mixing was done toward the top of the base to blend the material nicely, and to make it uniform. Both sheepsfoot rollers and pneumatics were used for compaction; in fact, the base material rolled in so fast that two compaction spreads had to be set up. A sheepsfoot roller and water tank truck were assigned to each spread to handle the material as it came in. Water was somewhat of a problem. Ironically, the new Friant-Kern Canal crosses the highway where Griffith built the new section, but no irrigation water has reached that far as yet, pending completion of the Tracy Pumping Plant. Griffith had to pipe water halfway from the nearby town of McFarland, set up a standpipe, and haul it the rest of the way with tankers. A 5,000-gallon unit on a Euclid truck, and several smaller units were used.

The subgrade was perfectly shaped, and blade-trimmed to a tolerance of 0.02 foot. Following that operation, the 8-inch Blaw-Knox steel forms were set, prior to the cement-stabilizing operation. The form trench was excavated by one of the No. 12 motor graders, whose blade dug down to within about one inch of grade. Final fine-grading and the setting of forms was done by a labor crew.

Cement-Treated Subgrade

One of the most critical and important items was the cement-treated subgrade, because unless it stayed well out ahead—but still within the area covered by forms—the paving crew would be held up. This was the last thing Griffith Co. wanted, because the job was one of the first in that area for a long time where Griffith wasn't bothered by traffic. Speed, therefore, was important.

Following the shaping of the windrow, a cement transport truck, hauling from the job batch plant, injected the 3 per cent cement content. A small metering device on the rear end of the 125-barrel tanker controlled the application of bulk cement, and left a small ribbon of that material neatly deposited on top of the windrow. The 3 per cent figure was calculated on the basis of 132 pounds per cubic foot, with 95 per cent of standard compaction determined by California methods, which in general provide a somewhat greater requirement than the modified AASHO method.

The intimate blending of cement and soil was accomplished by a Barber-Greene traveling plant, which picked up all the material on a cold elevator and hoisted it up to the pugmill on the plant. Water was added at the pugmill, as a water tank truck stood by in constant attendance. The mixed material dropped down behind the Barber-Greene machine, and a drag plane struck it off to neat lines.

Initial compaction consisted of a knockdown pass by a Buffalo-Springfield 3-axle tandem steel roller. After this machine covered the entire area in sections about 150 feet long, a mechanical shop-built fine-grader moved up.

This small machine consisted basically of slanted cutting blades which trained excess material to a center pickup opening. A small screw conveyor, driven by a Novo gasoline engine, carried the excess cement-stabilized soil through an enclosed housing to the disposal point outside the forms. Naturally, since a drag blade had already worked on the material, there was little excess to remove. The fine-grader was drawn along by a heavy truck.

C. & E. M. Photo

At the Conveyco batch plant near the southern end of the job, a Lima clam loads aggregates to the bins as transports deliver bulk cement.

Following this fine-grading, the final compaction was then administered. An old Buffalo-Springfield steel roller had been re-rigged with rubber tires, and this heavy pneumatic device compacted the stabilized base to the 95 per cent minimum limits set up by the specifications. A Mack-mounted asphalt distributor then sprayed the seal

(Continued on next page)

Nerve center of Charleston, West Virginia's busy Kanawha Airport, the architectural concrete Terminal Building is acclaimed as one of the handsomest and most efficient structures of its kind. View above shows building from airport apron side. Carved from rugged sandstone hills, runway and service building grading required movement of 9,100,000 cubic yards of rock and dirt. An idea of the size of the operation is given by the fact that on site now occupied by Terminal Building, there once rose a hill 50-feet higher than control tower. Architects for the building: Tucker & Silling, Charleston, West Virginia; Contractor: Kuhn Construction Co., Charleston, West Virginia.

Contractors of Kanawha Airport Terminal Building Report:

"Plywood Cuts Formwork Time and Labor Costs By Over 20 Per Cent"

ECONOMY, SPEED AND APPEARANCE of finished concrete. These constitute the three-way yardstick by which plywood's performance was measured in building the new Kanawha Airport Terminal Building.

Consider speed and economy. According to Charles J. Kuhn, president Kuhn Construction Co., contractors on the airport building, "Plywood speeded formwork operations all along the line . . . cut application time and labor costs by at least 20 per cent."

Consider appearance. Architects Tucker and Silling who specified plywood on the job because "the panels permit a smooth monolithic surface to be cast simultaneously with structure," report that concrete surfaces on the Terminal Building are "uniformly smooth and even-textured."

Conclusion? Simply this: Public building or industrial structure . . . apartment or heavy construction project—plywood forms do a *better* job, *faster, more economically.*

Douglas Fir

Plywood

AMERICA'S

coat of asphalt emulsion to cover the stabilized earth.

Paving at High Speed

The concrete paving went in at high speed, with every phase of the operation geared to reduce lost motion to an absolute minimum. For example, Griffith Co. used its own batch trucks. That was much more than a happenstance. The company has found out through experience that rented trucks are often so badly balanced that they cannot back in to a paver skip with the body elevated. Valuable motion is lost. By using its own fleet of White trucks, with specially balanced Cook Bros. 4-batch dump bodies, the company eliminated all lost time at the paver. Even on a 5-mile haul, 13 batch trucks kept the paver humming at capacity.

The paver was a Koehring 34-E Twinbatch machine, with dual drums, a 35-foot boom, and conventional dump bucket. The concrete batch called for three sizes of rock, one size of sand, cement, and water. For the first lane, the paver crawled along on subgrade material outside the forms. On the second lane, the machine walked along on previously poured concrete. Damage was prevented by the use of 10-foot strips of reject rubber conveyor belting 24 inches wide.

C. & E. M. Photo

Ordinarily this Moto-Crane stripped forms on the U. S. 99 job. But this morning the crew had to jump a bridge and the Moto-Crane picked up the Johnson finisher.

Mixing water came from the standpipe at the end of the McFarland pipeline. Tank trucks hauled from that point to the paver, and transferred their loads to a storage trailer of 2,500-gallon capacity. The trailer followed along behind the paver, connected by a stiff drawbar.

No special pains were taken about dumping the batches, because the big 1.5-yard batches covered the subgrade between forms with very little "stringing" by the operator. The fresh concrete went in just ahead of the first machine in the spreader-finisher lineup: a Jaeger concrete spreader.

The spreader made but one pass over the concrete. That sufficed to distribute the concrete between forms and give it a rough strike-off. A Jaeger-Lakewood finishing machine, equipped with two finishing screeds and a tamping foot, then moved over the concrete. Three large, heavy-duty electric vibrators mounted on the front of the finisher frame worked on the fresh concrete, and when they had finished their work, the material was well consolidated and the surface was creamy-smooth. Only one pass of this machine was necessary.

The major part of the fine finish was put on by a Johnson Float Finisher, which made many passes before the surface was perfect. A preliminary knockdown pass smoothed the concrete fairly well, and a rolling pass with the heavy wooden roller on the machine pressed any large particles down below the surface. Two men with a portable knife then inserted at 15-foot intervals a narrow 2-inch strip of mastic joint material, to form the dummy contraction grooves. There were no other joints in the pavement, with the exception of a longitudinal center joint. The keyway for this joint was formed by inserts bolted to the form, and the dowel bars consisted of ⅝ x 36-inch tie bolts, with a long nut in the center.

After the Johnson finisher had traveled back and forth until the concrete surface was smooth and even, a final pulled-burlap finish was placed on the material. Hunt Process Gray curing solution was applied under a subcontract with Hunt Process. A small truck-mounted spray outfit, with compressor and curing drums, worked well for this, and its operator had no trouble keeping up with the paver.

All forms filled one day were stripped and moved ahead the next. Griffith Co. used a Lorain Moto-Crane to pull form sections, pins and all. The forms were cleaned, loaded on trucks, and hauled ahead to be re-laid. Even on that operation, the pins were driven by a hand gun and a small Schramm compressor.

Batch-Plant Setup

It was impossible to set the batch plant in the center of the job. Farming and other activities along the right-of-way made it hard to get in anywhere, and the company had to be content to set the Conveyco plant up within about ½ mile of the southern end.

The setup was unusually efficient, however, because it permitted trucks to load without backing in, and the loading clam could reach every aggregate pile without having to travel. Aggregates and sand came from a commercial plant Griffith Co. owns and operates near Bakersfield. These materials were trucked out in large trailers and dumped in the respective piles around the Lima clam.

A 1¾-yard Owen clamshell bucket on the Lima charging crane kept the bins supplied even on the biggest day's run.

Monolith bulk cement was hauled in from the Tehachapi plant, about 56 miles away. Large truck-towed trailers, owned by Fortier Trucking Co. of Fresno, hauled approximately 127 barrels at a trip. The cement was trans-

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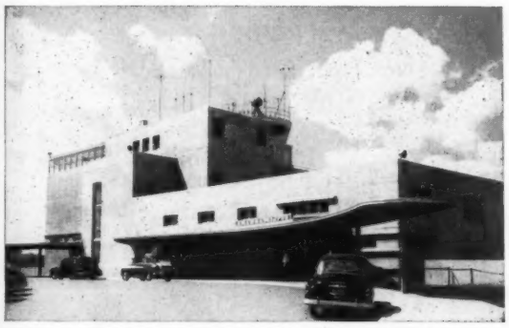
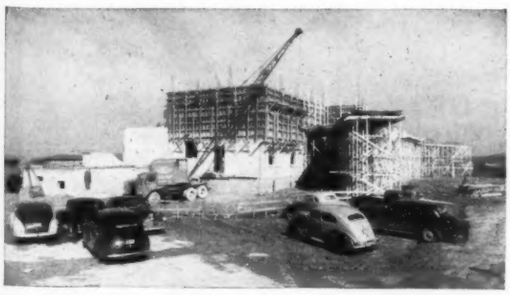
Re-Use of Plywood Form Panels Helps Reduce Construction Costs



Passenger approach side view of Terminal Building shows pleasing functional design obtained by balancing vertical and horizontal masses. In addition to time and labor savings, re-use factor of plywood forms helped reduce construction costs on the job. Re-used to job completion, contractors report, plywood forms were still in good condition after last pour.



Construction view shows plywood forms in place. Form sections were built by placing ¾"-thick Exterior Concrete Form panels across studding. Forms were held in line with double 2"x4" wales, backed by double 2"x6" liners, placed vertically. After each use, plywood forms were cleaned, re-oiled and crane-erected into position for next pour. Note scaffolding at right which supports plywood canopy forms.

Large, Light, Strong Real Wood Panels

For additional data on Douglas fir plywood for concrete form work, write (USA only): Douglas Fir Plywood Association, Tacoma 2, Washington. Of particular interest are two booklets: "Concrete Forms of Douglas Fir Plywood" and "Handling PlyForm".

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New Keely PlyForm calculator gives construction data for plywood forms, based on hourly rate of pour. Complete with leaflet, "Design Assumptions for New Keely Calculator." Send coupon now!

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Concrete Paving Crew Maintains a Fast Pace

(Continued from preceding page)

ferred to two 450-barrel Conveyco silos through a ground-level hopper and screw conveyor.

The batch plant was handled manually by one operator. Aggregate in 2½, 1½, ¾-inch and sand sizes was weighed out in a batch hopper and dumped to the trucks below. Then the truck picked up its cement and was on its way. Each batch truck hauled 4 batches of 1½ yards each.

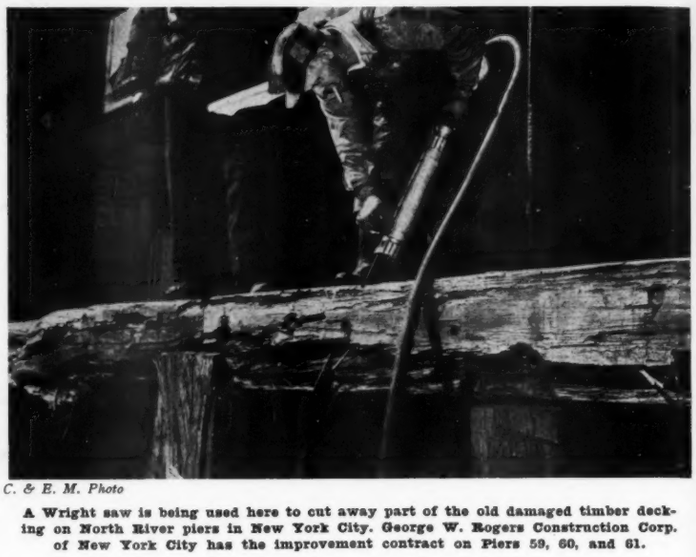
Personnel

Griffith Co., whose main office is in Los Angeles, has maintained a district office at Bakersfield for many years. Shelton Immel, District Manager there, was in general charge of field work. Supervisors responsible for the good progress and high standard of work included Superintendent Lloyd Leonard and his assistant, W. D. McDonald. Perry Akard was the Concrete Foreman.

On the California Division of Highways side of the picture, Phil Boulton was Resident Engineer, while F. N. Hveem was Construction Engineer and George T. McCoy was State Highway Engineer.

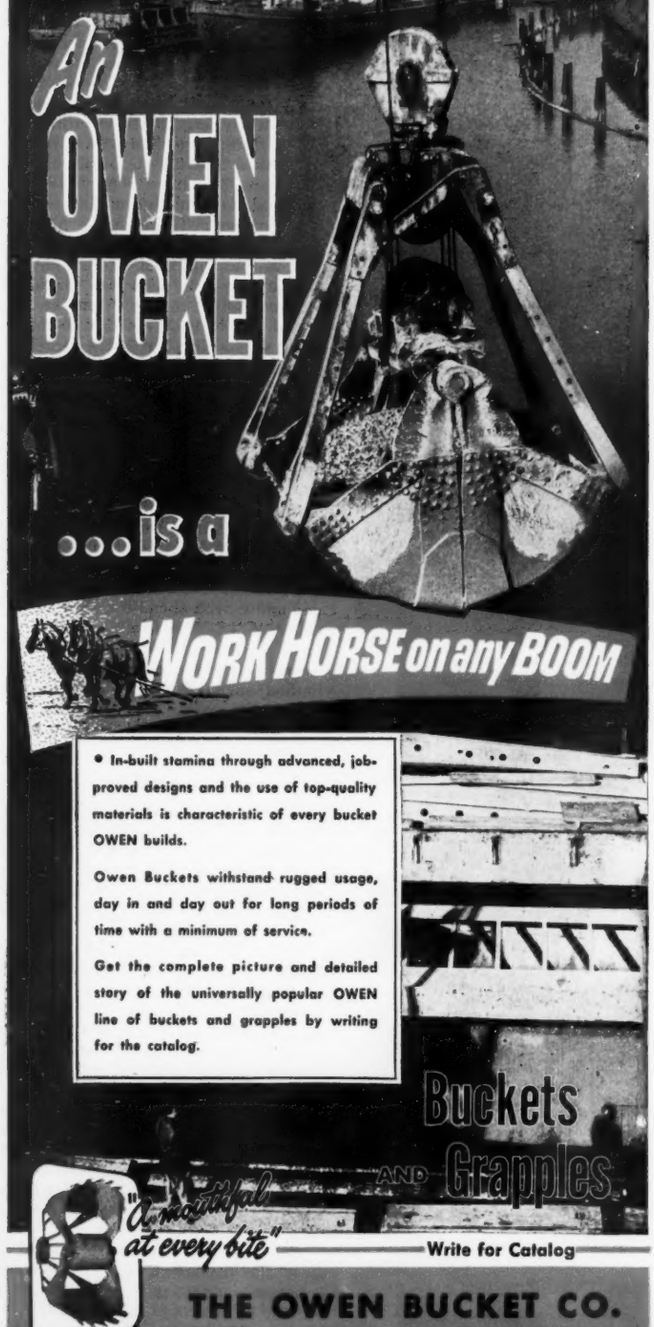
The project was singled out by the Research Department of the Bureau of Public Roads, along with other outstanding jobs over the nation, for careful study. Most of the trucks and other equipment were fitted with automatic recorders, and men with stop watches and prepared forms made a very careful analysis of the various paving operations. So in addition to making a fine new highway for traffic to use, the job will also provide good unit-production information for the future use of BPR and other interested agencies.

The careful selection and use of good lubricants at regular intervals will keep your equipment operating efficiently and economically.



C. & E. M. Photo

A Wright saw is being used here to cut away part of the old damaged timber decking on North River piers in New York City. George W. Rogers Construction Corp. of New York City has the improvement contract on Piers 59, 60, and 61.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Tractor Attachments

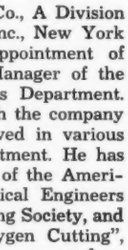
A new catalog about a complete line of allied equipment for Caterpillar diesel tractors has been prepared by Trackson Co., Box 728, Milwaukee 1, Wis. The products which it describes and illustrates include the Traxcavator tractor-shovel which is available in five sizes, pipe layers, angle graders, earth augers, tree dozers, brush rakes, swing cranes, and TracLoaders. On-the-job photographs show this equipment doing many types of work.

This literature may be obtained from the company by requesting Catalog 1106, or by using the Request Card at page 16. Circle No. 413.

Airco Appoints Roper

Air Reduction Sales Co., A Division of Air Reduction Co., Inc., New York City, announces the appointment of Edward H. Roper as Manager of the General Technical Sales Department. Mr. Roper has been with the company since 1936 and has served in various capacities in that department. He has been an active member of the American Society of Mechanical Engineers and the American Welding Society, and is a co-author of "Oxygen Cutting", a recent textbook on oxyacetylene cutting.

Cementone GRAY SPONGE RUBBER EXPANSION JOINT



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1900 So. Kostner Ave., Chicago 23, Ill.

The new Cyclo-Core drill bit with removable Cyclo-Center is designed for precision drilling in concrete, masonry, and similar hard material.

Precision Starting Of Holes in Concrete

A new Cyclo-Core carbide-tipped masonry drill bit with a removable Cyclo-Center has been developed by New England Carbide Tool Co., Inc., 60 Brookline St., Cambridge 39, Mass. The Cyclo-Core drill bit is designed for precision drilling in concrete, glazed tile, or other hard masonry materials. It uses a rotary-type drill with pressure applied for holes ¾ inch to 2 inches in diameter.

The removable Cyclo-Center eliminates the use of a wood template to start holes. The Cyclo-Center accurately locates and starts a hole. As soon as the hole is spotted, the Cyclo-Center is removed. This also does away with walking of the bit or marring of the surface being drilled, the company says.

Dust is expelled by the Cyclo-Core as it drills by means of the machined-in spiral threads running the full length of the body. The threads act as automatic runways for removing dust from the hole. Each bit has a port opening for cleaning out the core.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 449.

New Trenching Unit Is Tractor-Mounted

A new trenching unit for the Minneapolis-Moline Model RT-1 tractor has been developed by Mobile Trencher Co., 140 W. Maple Ave., Monrovia, Calif. It is available in two models—one with a bucket line 12 to 16 inches wide, which is adjustable to depths of 56 inches, the other with a bucket line 18 to 22 inches wide and a digging depth adjustable to 60 inches.

The trencher is designed for simple one-man operation. All controls are near at hand and the complete action of the trencher boom and the conveyor can be observed by the operator at all times. Spoil may be thrown to either side. Digging speeds for various soil conditions are regulated by a gear combination on the trencher and the regular tractor transmission speed. Forward speeds vary from 70 to 450 feet per hour.

The Mobile Trencher is equipped with dust-sealed self-aligning bearings which have Zerk fittings for all movable parts. Bucket lines are bolt-mounted on heavy-duty dry roller chains. As an overload release, the unit is provided with shear pins in the hub on the counter driveshaft. These pins are standard and may be replaced in a few minutes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 484.

Aeroquip Plant Expansion

The new Burbank, Calif., plant of Aeroquip Corp., Jackson, Mich., is part of an extensive expansion program for increased production of its line of flexible hose, self-sealing couplings, and other products. The new plant is operated by Aero-Coupling Corp., a subsidiary.

Other expansion includes the recently completed addition of a new 65,000-square-foot building to Aeroquip's main plant in Jackson, and the acquisition of another subsidiary, Metalco, Inc., with a plant in Cheboygan, Mich.

Roof Fill Insulation

A new 8-page illustrated brochure on the use of Permalite aggregates in concrete, as a lightweight insulating roof fill, is available from Perlite Div., Great Lakes Carbon Corp., 18 E. 48th St., New York 17, N. Y. Features claimed for Permalite concrete are its insulating properties, fire resistance, light weight, strength, and economy. The bulletin gives the various mix quantities as well as other technical data. A typical specification is included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 435.

Hustling Pipeline Work

A new 12-page booklet, titled "International Power Lowers the Boom on Pipelaying Costs", has been prepared by International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. The part International crawlers can play in handling every phase of the pipelaying business is presented in picture-caption style. Subjects include ground work, preparing the pipe, lowering, backfilling and clean-up, and auxiliary operations. The booklet also contains a Selectograph showing the lifting capacity of each International tractor when working with a matching pipe boom.

This literature may be obtained from the company by requesting Form No. CR-113-A, or by using the Request Card at page 16. Circle No. 474.

Do your sealcoating and ice control jobs the fast easy Swenson way. Spreads any width or amount desired.

Free Information

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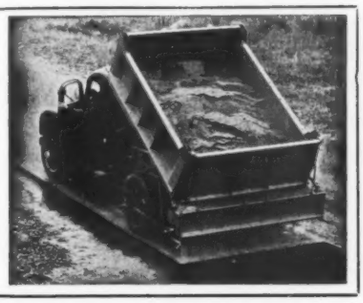
Lindenwood, Illinois



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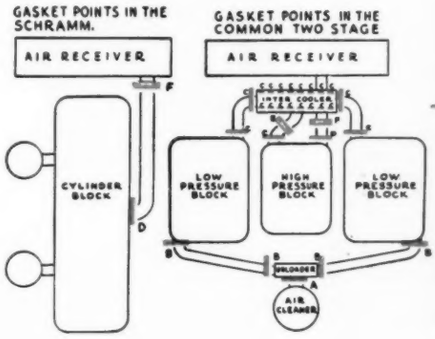

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You are familiar with our complete line of versatile air compressors, which offer many exclusive advantages, but when you specify SCHRAMM you are in a position to *save further* by taking advantage of our carefully-planned *service*. For the many details which make SCHRAMM your best air compressor buy, write us today.

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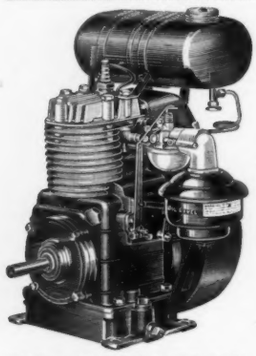
THE COMPRESSOR PEOPLE · WEST CHESTER · PENNSYLVANIA

Mobile Radios

A 12-page bulletin highlighting the use of 2-way mobile radios in various industries is available from the Mobile Communications Section, Radio Corp. of America, Point and Cooper Sts., Camden, N. J. It explains what a 2-way radio is, what it does, and how it works. On-the-job photographs show typical base and mobile stations. Sections devoted to individual industries—one of them to construction—point out how this system can expedite materials handling, coordinate surveys, and reduce costs on construction work. Additional data are given on RCA services.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 417.



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State and University Study Curing Methods

More economical and efficient methods of curing concrete pavements are being sought in a joint project of the Delaware State Highway Department and the Civil Engineering Department of the University of Delaware.

Reporting upon the project, most recent of four undertaken, Charles N. Gaylord, Professor of Civil Engineering at the University, said, "It is hoped that this project will reveal the merits of various methods of curing concrete. Although considerable research of this type has been carried on, the subject is still controversial. Just what information is required to shed light on the subject is as great a problem as how to acquire the data.

"One theory," he said, "is that very small cracks develop in the concrete slab in the early stages of curing because of the slab's warping." The warping is caused by temperature variations in the concrete and induces damaging tensile stresses. "If this theory is true, a very important factor in the curing of concrete is to hold temperature variations to a minimum," said Professor Gaylord. "So far our tests on four slabs have shown a variation in temperature from the top to the bottom of the slab of as much as 20 degrees F. These results indicate the practicality of the project and the feasibility of future work along these lines."

The other projects being investigated include tests on: (1) the performance of new concrete pavements constructed with 90-foot contraction joints (this problem is to include periodic performance surveys and measurement of joint openings); (2) tests and evaluation of granular material in order to determine suitable specifications for selected material; and (3) re-evaluation of the soils in Delaware which will undergo frost heave — and where and under what circumstances frost protection is warranted.

Other members of the civil-engineering faculty at the university devoting considerable time to the Joint Highway Research Project are Dr. A. R. Jumikis, and Clyde N. Laughter, Assistant Professors, and Vincent A. Forss, Instructor. Two courses were offered at Dover in the past college year in connection with the project. Many highway department engineers enrolled.

"The highway field has an acute need for men who have advanced training in its fundamentals," Professor Gaylord pointed out. "This advanced training is especially valuable when carried out by an organized research group such as the Joint Highway Research Project."

The advisory board for the project outlines policy related to the research activities, recommends establishment of projects, accepts reports, and approves releases of data as they develop. The chairman of the board is W. W. Mack, former Chief Engineer of the Highway Department and Director of the Delaware Memorial Bridge Division, now retired. Other members include Richard A. Haber, Chief Engineer of the Highway Department; Earnest Davidson, Chief of Tests for the Department; M. O. Bader, representing the Associated General Contractors; and Ernest S. Wilson, Chief Engineer of the Hercules Power Co. University members are: Provost Allan P. Colburn, Dean David L. Arm of the School of Engineering, and Professor Gaylord.

Drill-Press Manual

"How to Run a Drill Press" is the name of a manual for shop men released by South Bend Lathe Works, 114 E. Madison St., South Bend 22, Ind., as a companion to its text "How to Run a Lathe".

The book contains practical information of value to experienced and inexperienced operators of small drill presses. The section covering care, operation, and maintenance includes illustrations giving the name and function of all important parts and the correct adjustment of each unit. Instructions and illustrations take the mystery out of grinding the drill point.

The methods of mounting and removing chucks and tools are explained and layout and setup practices are discussed. The book also covers several special classes of work such as boring and sanding wood parts, polishing and buffing, surface finishing, use of mortising attachments, vises, etc.

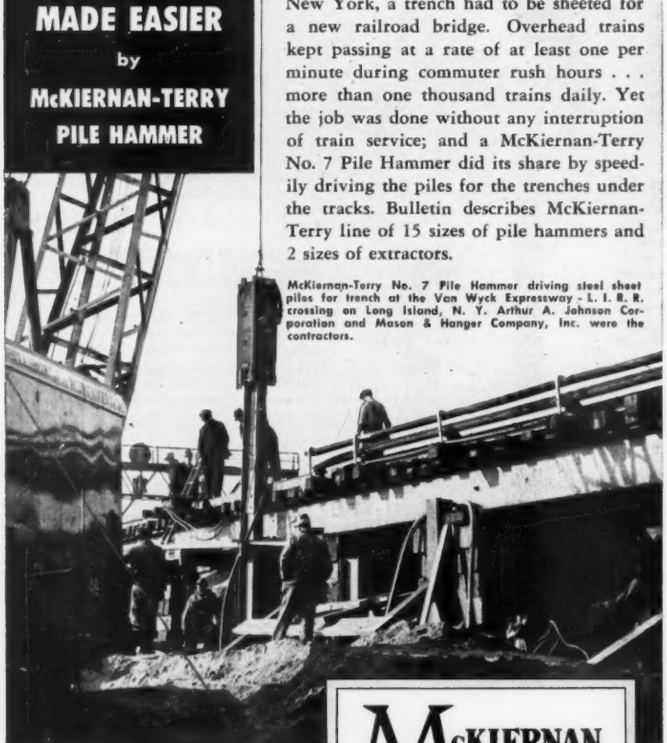
The 32-page pocket-size book may be obtained from the company for 25 cents.

Safway Promotes Allen

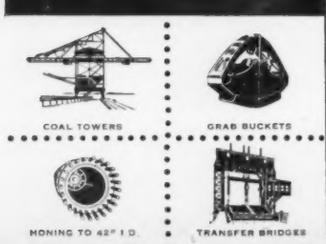
Arthur F. Allen is now Chief Engineer for Safway Steel Products, Inc., Milwaukee, Wis., maker of steel scaffolding and associated equipment. Before his promotion he was the company's Structural Engineer.

TOUGH JOB MADE EASIER by McKIERNAN-TERRY PILE HAMMER

This job was certainly a "toughie". To build a superhighway under the tracks of the Long Island Rail Road near Jamaica, New York, a trench had to be sheeted for a new railroad bridge. Overhead trains kept passing at a rate of at least one per minute during commuter rush hours . . . more than one thousand trains daily. Yet the job was done without any interruption of train service; and a McKiernan-Terry No. 7 Pile Hammer did its share by speedily driving the piles for the trenches under the tracks. Bulletin describes McKiernan-Terry line of 15 sizes of pile hammers and 2 sizes of extractors.



McKiernan-Terry No. 7 Pile Hammer driving steel sheet piles for trench at the Van Wyck Expressway - L. I. R. R. crossing on Long Island, N. Y. Arthur A. Johnson Corporation and Mason & Hanger Company, Inc. were the contractors.



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New Vehicle Tunnel Shortcut Across NYC

Second Underground Access Between New York City Bridges Takes Growing Traffic Load Off the City Streets

• FOLKS living more than 50 miles away from New York City think of it as a city of skyscrapers, but by this time it ought to be pretty well known for its tunnels too. Right now there are hundreds of miles of auto, train, and subway tunnels burrowed under the city, with more being built every day.

Latest of these will be the $8,000,000 179th Street Tunnel now being constructed by Poirier & McLane Corp. for the Port of New York Authority. This new ½-mile tunnel runs under west 179th Street to connect the George Washington Bridge with the Washington Bridge and the Harlem River Speedway. Plans were made 20 years ago to get crosstown traffic off the streets connecting these over-water arteries. The Washington Bridge crosses the Harlem River and offers access to the Cross-Bronx Expressway and the Bronx Whitestone Bridge, and these in turn lead into the New England road network. The George Washington Bridge is a principal access between New England and the south, and of course New York and New Jersey.

At the present time a tunnel at West 178th Street, a two-lane unit with a 22-foot roadway, is being used to carry both east and west crosstown traffic. Construction of the West 179th Street Tunnel will double the underground capacity and add greatly to safe driving. When it is completed, it will carry westbound traffic and the West 178th Street Tunnel will carry eastbound traffic. Each tunnel is designed for a capacity of 2,200 vehicles per hour.

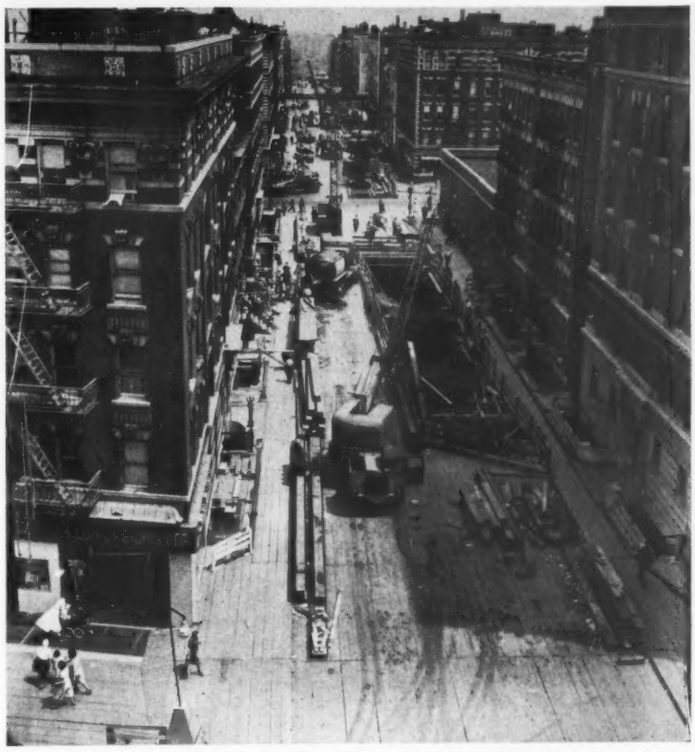
Additional projects tying in the arterial systems are being undertaken by the contractor for the New York State Highway Department. The overpass between the Washington Bridge and Amsterdam Avenue has already been completed. Easterly approaches to both the West 178th Street and West 179th Street Tunnels are near completion.

The contract for the tunnel structure was let to Poirier & McLane Corp., Yonkers, N. Y., for approximately $6,000,000 in February, 1949. The total cost is estimated by the Port of New York Authority to be approximately $8,000,000. Work was started in March, 1949, and completion is scheduled this year. A separate contract for the construction of the ventilation-building foundation for the tunnel was also performed by Poirier & McLane.

Total length of the tunnel is 2,415 feet, with a moderate grade throughout, rising from the east to the west. Initial grade starting at the east portal is 3.6 per cent for a length of 250 feet. This is followed by a 1 per cent grade for 975 feet, a 4 per cent grade for 270 feet, and a 1.8 per cent grade for 100 feet at the west portal. The remaining distance of the total length is taken by vertical transition curves. Outside tunnel dimensions will be 32 feet 10 inches wide x 30 feet 2 inches high. These dimensions will enclose a roadway surface of 22 feet, a 4-foot 4-inch sidewalk strip, and a 1-foot 10-inch strip on the opposite side. Inside tunnel clearance will be 14 feet. The cross section, fairly standard for vehicle tunnels, will have vertical sides with an overhead and an invert arch. The lower arch area will carry the incoming supply of fresh air; the upper arch area, the exhaust air.

Building Examination

Prior to any actual work, an extensive examination was made of every building along the route. Foundations, interior and exterior wall surfaces, and door frames of each and every building were checked by two investigators representing the contractor and one each for the Port of New York Authority and the insurance company. Building owners were invited to accompany the examining group. This work required about 6 months. Most of the buildings in the area are very old and have foundations that are for the most part rubble in various stages of deterioration. Detailed records of all building conditions are kept on file for adjusting any claims that might be lodged against the contractor.



Working on timber over-decking, Lorain Moto-Cranes handle skips and lower materials into excavations for the 179th Street Tunnel across New York City.

The first phase of the contract work was the protection of stone copings over entranceways and the bracing of stoops, porches, and fancy stonework over the entrances of the dwellings. These were all properly tied or braced to prevent falling during blasting. Necessary underpinning of buildings along the route was subcontracted to Spencer, White & Prentis, of New York. Initially the underpinning was accomplished with poured concrete piers, or by jacking steel cylinders underneath and filling with concrete. However, as the job progressed, it was found desirable to use continuous-wall underpinning which served to keep the ground from running into the cut and undermining the buildings.

Soldier-Pile Driving

The over-all job was accomplished by the cut-and cover method. First in line was driving soldier beams with a Bucyrus-Erie steam pile-driving rig. The piles were driven on 10-foot centers to bedrock, which ranged from 4 to 42 feet below the street surface. Pile sizes varied from the 12 BP 53's used for anticipated depths of 10 to 15 feet, up to the 18 WF 114's used for depths of 30 feet or more. A total of 238 steel piles were used. All of the soldier beams will be left in place after completion of the tunnel. Where the depth to rock was less than 10 feet, 12 x 12 timber posts were used.

Pits for the piles were hand-excavated to a depth of 4 feet in all cases to make sure that the utility lines were not disturbed—quite a job in New York where so much runs underground.

A large quantity of riprap was en-

(Continued on next page)

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132 W. VERDUGO AVENUE • BURBANK • CALIFORNIA

New Vehicle Tunnel Shortcut Across NYC

(Continued from preceding page)

countered in placing the soldier beams at the east end of the structure. It was probably backfill from an old subway construction job. This necessitated hand excavating to depths of 16 to 17 feet in some places. These pits were sheeted and braced. Rubble foundations of areaways which occur in front of almost all the buildings were faced and braced against the soldier beams.

Surface Excavation

Initial excavation was accomplished along the street surface using a Lima crane with a 1½-cubic-yard clamshell. Building lines in this section are 60 feet apart. Excavation was no easy job. There was everything under the pavement—water, steam, and sewer lines; gas mains; electric cables; telephone and traffic-light control ducts; etc. Street intersections were a nightmare. Not only were there places where a clamshell couldn't get down into the maze of pipes, there were places where a spade wouldn't fit. It was strictly a teaspoon job.

Initially, excavation was carried to a 50-foot width and to a depth sufficient to brace the 36-inch and 20-inch cast-iron water mains which ran down the center of the street. Gas mains were removed and replaced along the sidewalk planking. The excavating cranes backed away from their cut and made a 180-degree load swing to waiting trucks. The material, a mixture of sand, clay, and rubble backfill, was carried to three dumping areas offered by the Port Authority. Quick returns were possible since all areas were within a 5 to 10-minute traveling distance. When a 20-foot cut was made along the street, 30 WF 172 deck beams were placed on the soldiers. Coming in from the other end of the street, a truck crane placed the 12 x 12 timber decking. The decking was required to carry a load of 200 pounds per square foot or 10 tons per axle with axles 5 feet on centers. Except on weekends, only the contractor's vehicles used the street. The intersections, of course, got constant use.

The truck cranes also placed the 36 WF 150's and 21 WF 62's which were hung from the deck beams to support the 36-inch and 20-inch cast-iron water mains. The 36-inch main ran about half the length of the cut; the 20-inch pipe paralleling it ran four-fifths of the way. In the remaining fifth, a 12-inch-diameter extension of the 20-inch pipe was replaced by a 6-inch pipe on the sidewalk to facilitate excavation. In this area, about a block long, excavation was done with a 2-yard Thew-Lorain shovel. Deck beams and decking were put on as in the other sections.

Electric power and telephone ducts were hung from the deck beams. The existing sewer which ran along the center line of the street was replaced by concrete sewers on both north and south sides. During construction the sewer was replaced by 12 or 18-inch Armco corrugated-steel pipe for temporary removal of both sewage and run-off. Final sewage lines were installed during the concrete-pouring operations.

Where rock was encountered in the area to be taken by the new sewer lines, line-drilling methods were used. The drill holes, 6 inches on centers, were driven to the subgrade of the new sewers. This cross section was drilled, blasted, and excavated through openings in the decking. Depths varied between 13 and 21 feet below the street surface. When the rock was removed, the temporary flumes were hung from the deck beams.

Work on the Tunnel

Following this the tunnel proper was line-drilled to the side benches with wagon drills and quarry bars. Headings were started at the east and west portals, and at Wadsworth Avenue, which was in near-center position. The average depth below street surface was 40 feet. Longitudinal drill holes were 6 inches on center. Transverse drill sections were made vertically along the face of the three headings working into the rock. These were shot laterally and picked up by three heading shovels which dumped into waiting trucks. A 1-yard bucket on a Lorain 50 was used at the east heading. A Lorain 80, with a 16-foot cut-down Lima boom carrying a 1½-yard bucket, was used at the west heading. A Lorain 50 with a 1-yard bucket was used at the center heading. The shovel runner here made about a 120-degree swing. There wasn't enough room to get the trucks alongside for a quarter swing, but he wasn't going to make a half turn if he could help it.

An average of 40 sticks of 40 per cent

(Concluded on next page)

C. & E. M. Photo

Poirier & McLane powdermen tamp charges for cutting away a 6-foot-deep invert in the 179th Street Tunnel. The contractor-built rig in the photo drilled the blast holes.

Yours for Only $1.00

This NEW Time-Saving Keely PLYFORM CALCULATOR

SAVE time designing and building forms of PlyForm, the concrete form grade of Douglas fir plywood. Handy slide-rule calculator gives construction data, based on hourly rate of pour. Included is booklet, "Design Assumptions for New Keely Calculator." Clip coupon — now!

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I enclose $1.00 each to cover costs.

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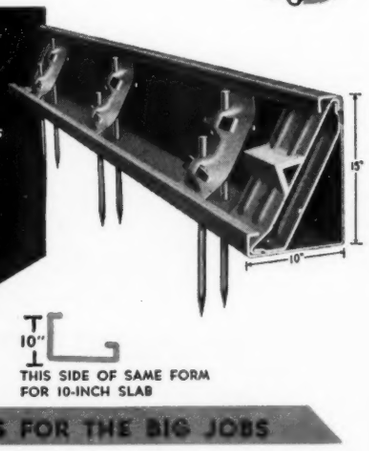

15" THIS SIDE FOR 15-INCH SLAB

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WRITE FOR HELTZEL BULLETIN K-19

HELTZEL

STEEL FORM & IRON CO.

WARREN, OHIO

Du Pont dynamite were used across the face for a 20-foot cut. Where rock was high, extreme care had to be taken to avoid damage to the water mains during blasting. About ten 5 to 10-yard dumps were used by the contractor along with a half-dozen hired trucks for material removal. Four-inch lagging was installed behind the soldier beams where earth was encountered. An extra support was made at the rock bench for the soldiers. Two diagonal lines set about 20 degrees were drilled into the rock. Hairpin dowels were inserted and grouted to a concrete kicker to support the base of the soldier beam laterally.

The invert section, a hollow cut about 6 feet deep, was drilled and blasted separately. Drilling on the invert bench was done with a contractor rig: a horizontal jumbo bar with two Ingersoll-Rand portable drills bar-mounted on a converted Hughes-Keenan Roustabout. This did the job efficiently and economically, the men said. It was easy to shift the drills across the bar and easy to move the rig up the line.

Air for all drills was supplied by compressor stations at the east and west portals. At the east portal an Ingersoll-Rand, a Chicago Pneumatic, a Joy, and two Gardner-Denver portable compressors were used. Each was a 500-cfm unit except the Joy, which was a 650-cfm. They supplied a total of 2,650 cfm, through a 6-inch pipe, to the wagon drills and jackhammers operating on the east side. A 1,000-cfm Ingersoll-Rand stationary, a 500-cfm Ingersoll-Rand portable, and a Gardner-Denver 365-cfm portable were used at the west portal. Markley, Foundation Equipment Co., and Kadco dust collectors were used at all headings. A separate collector was required for every two wagon drills or every four hand drills.

Concrete Pouring

A concrete "sand wall" was placed against the rock wall surface of the tunnel to provide a smooth surface for applying a 3-ply membrane waterproofing. The waterproofing was protected by 3-inch cinder block. Tunnel walls are 1-foot 9-inch reinforced concrete. The arch roof is 1 foot thick at the center and 2 feet 8 inches at the sides. The invert is 1 foot 3 inches thick above the waterproofing. The waterproofing on the lower invert received a 2-inch mortar cover to protect the membrane from damage in placing the reinforcing rods. Concrete was poured in 6 stages: invert, side benches, roadway, sidewalls, roof arch, and tunnel ceiling. Transverse 10-inch 25.4-pound I-beams were placed 21 inches on center to support the road decking after the side bench pours were made.

Personnel

Excavation was accomplished with two shifts, a 7:00 to 3:00 and a 3:30 to 12 midnight. Directing the contractor's forces were John Decker, Project Manager, and Dick O'Sullivan, Field Engineer. Byron Gruver was Resident Engineer representing the Port of New York Authority. Harry Armstrong superintended the underpinning and building foundation work subcontracted to Spencer, White, & Prentis, Inc.

In the tunnel proper, a Lorain 50 digs rock. Notice how the utility mains and ducts were hung from the deck beams.

Portable Materials Dryer

A circular describing the Tarco portable aggregate and materials dryer is available from Tarrant Mfg. Co., 27-29 Jumel St., Saratoga Springs, N. Y. A photograph of the heater illustrates its many features. Dimensions and data on operation are given on the back page.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 454.

P&H Personnel Shifts

James C. Ray is District Manager of the Jacksonville, Fla., office of the Harnischfeger Corp., Milwaukee, Wis. Before his appointment he was an excavator salesman in the Jacksonville area. John H. Taylor, Jr., has left his post of Assistant Sales Manager of the P&H Large Excavator Division in Milwaukee to handle excavator sales for the company in the Philadelphia territory.

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SINCE 1859

Cement Distributor For Soil Stabilizing

A 2-wheel rubber-tired cement distributor for use with either bulk or sack cement has been introduced by Wood Mfg. Co., Box 620, 6900 Tujunga Ave., North Hollywood, Calif.

The distributor is attached directly behind a cement truck. Cement is dumped into the hopper of the distributor and is metered onto the windrow by a calibrated rotary vane. The windrow is automatically troughed by an axle-high V-spreader on the front of the distributor, to protect the cement from blowing away.

The Wood cement distributor has an adjustable capacity of 15 to 80 pounds per linear foot. It is easily attached to a truck and can be maneuvered on the job by one man, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 469.

This new Wood cement distributor has an adjustable capacity of 15 to 80 pounds per linear foot, and is easily attached to any truck.

Centrifugal Pumps: Sizes to 90,000 GPH

A new line of self-priming centrifugal pumps has been introduced by Chain Belt Co., 1666 W. Bruce St., Milwaukee 4, Wis. The line ranges in size from the small 1½-inch Model 4M up to the 6-inch Model 90M pump; capacities range from 4,000 to 90,000 gallons per hour. These pumps are guaranteed by the company to meet the capacity standards of the Contractors' Pump Bureau of the Associated General Contractors of America.

The new Rex pump is designed for easy and inexpensive replacement of wearing parts. Removal of the cover plate makes it possible to replace or adjust practically all the wearing parts in the pump, the company says. The patented high-carbon-steel air peeler and the open-type impeller provide maximum water-handling ability at all times. When abrasive wear on peeler or impeller destroys original clearances and pump priming, new pump efficiency can be restored by adjusting the peeler to original tolerance with the impeller.

A special feature of the new Rex pump is an impeller-shaft seal which is never subjected to pumping pressure. This results in longer seal life and less operating trouble, the company says.

Further information may be secured from Chain Belt Co. by requesting Bulletin 51-27. Or use the Request Card at page 16. Circle No. 432.

Study on Solder

A new 36-page illustrated brochure on the nature, properties, and uses of solder has been prepared by Federated Metals Division, American Smelting & Refining Co., 120 Broadway, New York, N. Y.

The wealth of subject matter in the catalog is indicated by the table of contents. Separate sections are devoted to thermal effects, mechanical properties, principles of soldering, and fluxes. Next, the selection of the proper solder for a job is explained. Fusible alloys, a group of alloys with low melting points, are described. Following a list of practical applications and a comprehensive description of all Federated solders is a resume of specifications and technical data. This section includes the melting range of tin-lead solders; ASTM, SAE, Federal, and Military specifications, as well as wire tables.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 501.

Hinz Goes to Wayne Div.

The Wayne Division of Gar Wood Industries, Inc., Wayne, Mich., announces the addition of A. C. Hinz to its Administrative Sales Staff. Mr. Hinz assumes charge of the winch and crane section of the division and will be responsible for the promotion and sale of winches, pole derricks, cranes and wrecker units. He was formerly employed at Gar Wood Industries.

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"Please send 10 more drums as soon as possible—We liked the first."
Geo. Souter & Company, Detroit, Mich.

"Any blacktop pavement without SUPER SEAL is as unthinkable as a 'tux' without a black bow tie."
Trop. Agri. Res'ch Lab'ty, Southport, No. Car.

". . . Any blacktop contractor who does not recommend SUPER SEAL is not dealing fairly with his clients, for a great deal more value is realized by completing the work with SUPER SEAL."
T. Reitzel, Buffalo, N. Y.

"We feel so thoroughly convinced of the merits of your product that we are enclosing a franchise application for southern California. Enclosed please find our check as down payment on material."
Moore Paving Company, Santa Monica, Cal.

"I am well pleased with the jobs done with SUPER SEAL and would be interested in a dealership for this territory."
J. Edward Soyster, Hollidaysburg, Penna.

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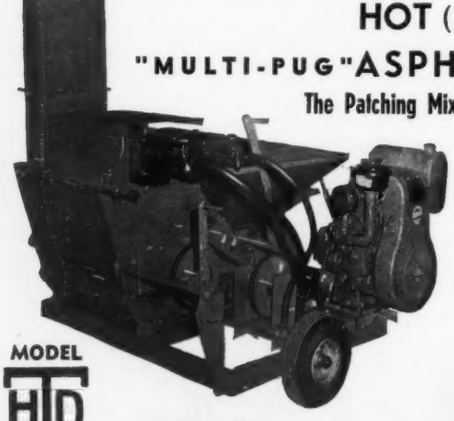

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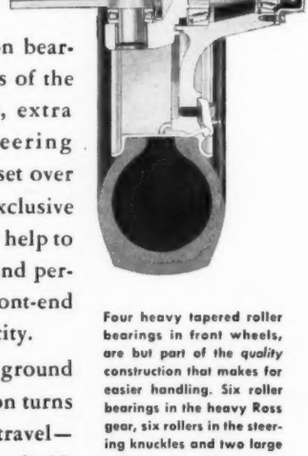

Precision made anti-friction bearings at all important points of the UTIL steering assembly, extra large molded rubber steering wheel, and front wheels inset over steering knuckle pins are exclusive UTIL design features. They help to make UTIL handle easier and permit the use of heavy-duty front-end loaders of maximum capacity.

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Four heavy tapered roller bearings in front wheels, are but part of the *quality* construction that makes for easier handling. Six roller bearings in the heavy Ross gear, six rollers in the steering knuckles and two large rollers in the tie rods are *quality* features.

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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

In Purchase of Cement, Oral Agreement Enforced

THE PROBLEMS: *A cement company's district sales manager and sales engineer orally agreed with a construction company's president to deliver 7,500 barrels of cement in daily carload shipments of 250 barrels each. Three carloads were delivered. The buyer sued the seller for damages for failing to deliver the remaining cement called for by the agreement. (1) Could the jury decide that the selling company approved the agreement made by its sales manager and engineer?*

An existing statute held that no agreement to sell goods should be binding on the parties unless the party to be held liable had signed a note or memorandum of the agreement or unless part of the goods were received by the buyer. (2) Under this statute, was the oral agreement enforceable?

The ordinary measure of damages for breach of an agreement to sell a standard commodity is the difference between the contract price and a higher market value at the agreed time and place for delivery. However, the cement company knew when the contract was made that the cement was needed for a state highway construction job that had to be performed within 100 days. (3) Was the construction company in this case entitled to special damages in view of this fact?

THE ANSWERS: Yes. (Marquette Cement Mfg. Co., defendant-appellant, v. Campbell Construction Co., plaintiff-appellee, 184 Fed. 2d 352, decided by the United States Court of Appeals, Sixth Circuit.)

The Court of Appeals noted that shipment of three installments of cement could be found by the jury to imply acceptance of the 7,500-barrel order, despite the fact that each installment delivered was accompanied by an invoice stating that no order or contract should be binding unless accepted in writing at the cement company's general office.

The court also said the construction company had a right to assume that the cement company's district sales manager and sales engineer were authorized to bind the latter company by the agreement to sell, there being nothing to show any lack of authority.

As to a basis for assessing special damages, the court said the evidence warranted the jury in finding that the cement company had been informed as to the nature of the construction contract, and that the damages sought were caused by breach of the sales agreement, which involved idling of road-building equipment and skilled labor, and extra expense by having to complete the job after winter weather had set in.

Blasting for River Channel Injures Adjacent Buildings

THE PROBLEM: *Were contractors engaged in widening a river channel liable for injury to buildings 230 feet or more from the site of blasting operations, without regard to negligence, on a theory that the operations necessarily endangered the buildings?*

THE ANSWER: Yes. (Whitman Hotel Corp. v. Elliott & Watrous Engineering Co., 79 Atl. 2d 591, decided by the Connecticut Supreme Court of Errors.)

The court rejected argument that liability was tested by whether or not the contractors used reasonable care. But it admitted that "to make out a case of intrinsically dangerous operations upon which absolute liability may be predicated, it is essential that it appear that the dynamite was discharged under such circumstances that it . . . necessarily or obviously exposed the person or property of another to the danger of probable injury." Otherwise, it must appear that the blasting was done negligently.

Incidentally, the court declared that damages recoverable against the contractors should be measured by the cost of placing the damaged buildings in their condition before the blasting.

In another case the court decided the same day, a highway contractor was held liable for damage done to nearby greenhouses by flying fragments of

(Continued on next page, col. 3)

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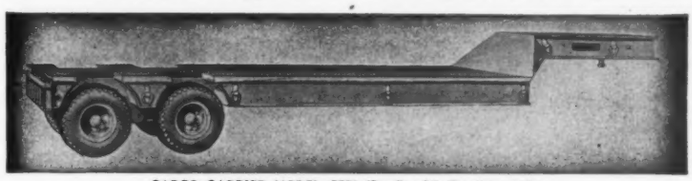

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FRAME—Constructed of beam sections throughout, electric welded. A ruggedly strong and efficient unit with minimum weight.

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If some of your lifting and moving jobs are crying for faster action, Bethlehem strongly suggests that you consider braided slings.

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Of course, the braided sling is but one of the many choices that Bethlehem makes available. If you feel that your needs are better served by a nonbraided type—either standard or special—our plant can readily handle your order to specifications. Remember: we are fully set up to furnish *every* class of sling, and our designing and manufacturing units are unsurpassed anywhere in the country.

Here's a suggestion: send us your prints, drawings, or sketches showing the kind of handling problem you have in mind. Braided slings may well be the answer; but if another type seems more logical for your application, we'll tell you so frankly. Before you take this step, however, you may prefer to look over our slings catalog. Ask for a free copy; it will be mailed promptly.

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Shop or Truck Hoist

Literature describing the Utility hoist, a hydraulically operated unit for shop or truck use, is put out by Unit Mfg. Co., 1229 Harmon Place, Minneapolis 3, Minn. The hoist is portable and has a 360-degree swing, roller bearings, a double-action hydraulic pump, and tubular-steel construction. Photographs show it mounted on a truck body and on a floor frame. Specifications and construction details are provided.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 421.

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Hopkins Combination Oil-Gas Dryer Unit

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Avoid Legal Pitfalls

(Continued from preceding page)

rocks and concussion. (Antinozzi v. D. V. Frione & Co., 79 Atl. 2d 598.) And the same principle of absolute liability was applied in a third case that also involved damage caused by blasting on a highway job. (Scranton v. L. G. De Felice & Son, 79 Atl. 2d 600.) In that case, the court further decided that the contractors were not immune from liability because they were acting under a contract with the state government.

Contractor's License Was Wrongfully Denied

THE PROBLEM: *The Arkansas general-contractors licensing law requires the licensing board to consider whether an applicant for a license has defaulted in complying with "the provisions of this Act", etc. The Act forbids engaging in the general contracting business in the state without a license. The board refused a license to a nonresident on the sole ground that he had bid on a Federal job in the state while his application was pending. The applicant had acted in good faith and was otherwise well qualified. Did the board abuse its powers in refusing him a license?*

THE ANSWER: Yes. (State Licensing Board for General Contractors v. Jones, 235 S. W. 2d 547, decided by the Arkansas Supreme Court.)

The decision was influenced by these facts: The contractor, resident of Oklahoma, had done much work of the same kind for the Federal government, and was justly confident that he would qualify as to the principal statutory requirements—experience, ability, character, manner of performing previous contracts, financial condition, and equipment. And he did nothing in Arkansas beyond exploring the license and applying for the license until a court decided that he was entitled to a license. His bid was submitted and his contract signed through a Federal office in Oklahoma. Action on the application for a license was stalled somewhat through the board asking for additional information which was promptly submitted.

General Contractor Was Not Subject to Taxation

THE PROBLEM: *Road and airport contractors hired trucks to haul materials, driven by the owners or hired drivers. The contractors paid the truck owners on an hourly, load, or yardage basis. A Federal statute imposes a 3 per cent tax on the amount "paid to a person engaged in the business of transporting property for hire". Were the contractors taxable under this statute?*

THE ANSWER: No. (Earle v. Babler, 180 Fed. 2d 1016, decided by the United States Court of Appeals, Ninth Circuit.)

The court overruled a decision of a collector of internal revenue that the truck owners were independent contractors. It upheld a ruling by a lower court that the truck owners and drivers were employees of the general contractors because subject to detailed control and direction in the loading, hauling, and unloading of materials.

Term "Unusual" Defined

THE PROBLEM: *In attempting to drill a well for the Government, a contractor encountered rock formation of such nature as to prevent completing the well—a condition which neither party contemplated. As affecting the contractor's right to additional pay, was the condition an "unusual" one?*

THE ANSWER: Yes. (Western Well Drilling Co., Ltd., v. United States, 96 Fed. Supp. 377, decided by the United States District Court, Northern District of California, Southern Division.)

The court said that the term "unusual" does not "refer to a condition which would be deemed a geological freak but rather a condition which would not be anticipated by the parties to the contract in entering into their initial agreement."

Lowest Bidder's Rights

THE PROBLEM: *A call for bids on waterworks construction reserved the right "to reject any or all bids". Under a statute requiring a public contract to be let to the "lowest and best bidder", did the lowest bidder have a right to enjoin award of the contract to another bidder and to compel award to him?*

THE ANSWER: No. (Fetters v. Mayor and Council of Wilmington, Del., 73 Atl. 2d 644, decided by the Delaware Court of Chancery.)

(Concluded on next page)

Get rapid dependable ACTION with

SUPER-VULCAN OPEN-TYPE
DIFFERENTIAL-ACTING
PILE HAMMERS
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That's right. Using 25 to 35 per cent less steam per blow, the Super-Vulcan delivers twice the usual blows per minute and rams them home with greater penetration per blow. Its fast, dependable performance, coupled with compactness for easier operation, rugged strength, simple design and positive action, bring you savings in time, maintenance and money. Too, the open type Super-Vulcan fits the same leads and uses the same accessories as the Vulcan Single-Acting Pile Hammer — for interchangeable efficiency.

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The court said that the reserved right did not authorize the municipal authorities to reject arbitrarily the lowest bid. But the statute requiring award to the lowest and best bidder was for the benefit of taxpayers and not "disappointed bidders".

A taxpayer joined with the unsuccessful bidder as a plaintiff. The court ordered that the case proceed to trial as to him, but dismissed it as to the bidder.

In support of its decision, the Delaware court cited a decision of the United States Circuit Court of Appeals, Eighth Circuit, where the lowest bidder on a paving job was declared not to have been entitled to a decree awarding the contract to him. (Colorado Paving Co. v. Murphy, 78 Fed. 28.) That decision was affirmed by the United States Supreme Court (166 U. S 719).

Federal Wage Law Covered Watchman

THE PROBLEM: *A watchman on a Federal housing construction project assisted in unloading materials brought to the site in interstate shipments. Was he covered by the minimum-wage provisions of the Federal Fair Labor Standards Act?*

THE ANSWER: Yes. (Durnil v. J. E. Dunn Construction Co., 186 Fed. 2d 27, decided by the United States Court of Appeals, Eighth Circuit.)

A lower court had decided that defendant contractor, who employed the watchman, was in legal effect an agent of the Government; as such, it was exempt from the provisions of the Fair Labor Standards Act, and subject only to the Eight Hour Law. The Court of Appeals reversed this decision. Supporting its view, it cited a decision of the United States Supreme Court which it regarded as being decisive. (70 Sup. Ct. 755.)

Not Liable for Cement Burns

THE PROBLEM: *A buyer of wet ready-mix concrete suffered serious burns on his knees because he did not pad the boards on which he kneeled in spreading the mix. He had had considerable experience in such work. Could he hold the seller liable on the ground that the latter impliedly warranted that there was no danger in so using the mix?*

THE ANSWER: No. (Dalton v. Pioneer Sand & Gravel Co., 227 Pac. 2d 173, decided by the Washington Supreme Court.)

The court also rejected a contention made by plaintiff's attorney that there was a hidden danger in use of the mix against which defendant seller was bound to warn him. The court said that the injury occurred in the handling of a "standard and common commodity", and that there was no attempt to show that its nature was known only to experts and "beyond the ken of laymen generally".

City Liable to Engineers For Terminating Contract

THE PROBLEMS: (1) *Was an Ohio city empowered to employ engineers to perform services on a sewer project for 4 per cent of the estimated cost of construction?* (2) *Was the city liable in damages for breaking the contract of employment and awarding a contract for the same services to other engineers?* (3) *Were the discharged engineers entitled to collect as damages the agreed commission, less what it would have cost them to perform the required services, with interest from the date when the services would have been completed?*

THE ANSWERS: Yes. (Jones v. City of Middletown, 96 N. E. 2d 799, decided by the Ohio Court of Common Pleas, Butler County.)

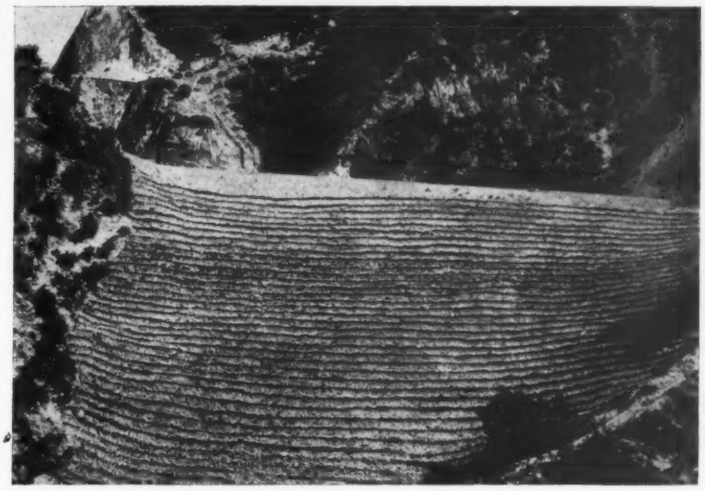
The City objected that there was sufficient statement in the broken contract of a basis upon which percentage compensation could be computed. The court responded that the City had accepted and acted upon the plaintiffs' estimate of cost of construction.

Engineer's Disapproval Did Not Bind Contractor

THE PROBLEM: *A construction contract made the contracting authority's engineer judge as to whether work had been properly performed. Could the engineer's disapproval of certain work prevent the contractor from collecting pay if there was nothing to show that the work or materials furnished by the contractor were deficient?*

THE ANSWER: No. (Lippert Bros. v. City of Atoka, 94 Fed. Supp. 630, decided by the United States District Court, Oklahoma, Eastern District.)

The court said that disapproval in such cases amounts to a species of fraud upon the contractor.

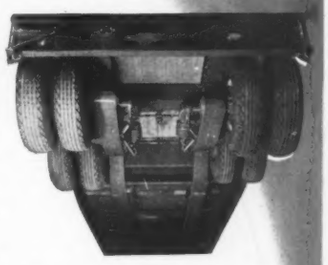


Wattling, a combination of brush planting and wire reinforcement, will hold this 140-foot-long slope in Los Angeles County against erosion for a long time. County prisoners from a detention camp did the work.

The MAJORITY of Your Heavy Hauling Jobs can be handled PROFITABLY with... the POPULAR

ROGERS Type "T"

LARGE CAPACITY IN AN 8 FT. DECK WIDTH—LEGAL IN ALL STATES. 8 TIRES ON 2 ROCKING STUB AXLES WITH LEVEL OR DROP DECK IN 15, 20, 25, 30 and 35 TON CAPACITIES



A worms-eye view of the sturdy rear end and frame construction of the famous "T".

By reason of its versatile adaptability to all kinds of heavy hauling jobs, the Rogers Type "T" has steadily increased in popularity.

It's a "natural" for small and large contractors and haulers.

If you are considering the purchase of one or more trailers, by all means investigate the Type "T".

It packs powerful advantages in a multi-purpose single unit.

Write for full details and catalog.

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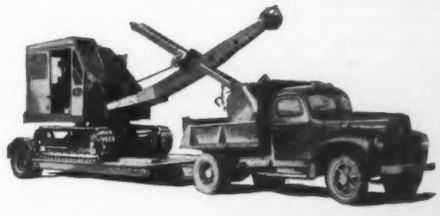
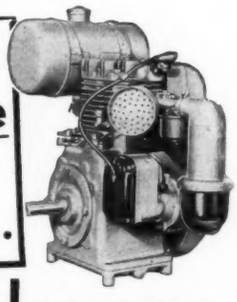


Also of timely interest is this ROGERS Tag-A-Long trailer which makes a dump truck serve as a tractor and effects sizable savings for contractors.

Gain More Power Advantage for Your 3 to 6 hp. Units...



Presented here are a few of the basic facts why Wisconsin Heavy-Duty Air-Cooled Engines offer important advantages to the user of power-driven equipment that has to deliver dependable on-the-job service:

1. Rotary type high tension magneto, with impulse coupling, mounted on outside of engine . . . operates as an entirely independent unit that can be serviced or replaced in a few minutes.

2. Self-cleaning tapered roller bearings at both ends of the crankshaft . . . will withstand side-pull or end-thrust without danger to bearings.

3. Maximum torque at usable speeds . . . most desirable on equipment that really has to go to work.

Your Wisconsin Engine distributor or dealer will be glad to co-operate with you in adapting Wisconsin Engines to your requirements. Write for detailed data.

Condensed Specifications
4-Cycle Single Cylinder

Engines	Model ABN	Model AKN
Bore	2 1/2"	2 7/8"
Stroke	2 3/4"	2 3/4"
Piston Displ. (Cu. In.)	13.5	17.8
HORSEPOWER		
1800 R.P.M.	2.5	3.6
2200 R.P.M.	3.1	4.5
2600 R.P.M.	3.7	5.3
3000 R.P.M.	4.2	5.9
3600 R.P.M.	4.6	6.2
No. of Piston Rings	4	
Fuel Tank Cap.	1 Gal.	
Weight, lbs.	Net	Crated
Standard Engine	76	89

MOST H.P. HOURS

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

Skyscraper Roofing

The building Pittsburghers have been looking up to for several months has recently received its "glass top" lid. Cellular glass insulation, 4-ply standard built-up roofing, and a gravel finish now cover the concrete roof deck of the 525 William Penn Place Building. The new building will house the general offices of the U.S. Steel Co. and its operating subsidiaries, and the Mellon National Bank & Trust Co.

Ground work on the new skyscraper began about two years ago, and Pittsburghers have gathered en masse to watch the structure rise out of the ground and grow to its full 41 floors in height. General contractor for the job was Turner Construction Co. Roofing contractor for the building is the Warren-Ehret Co. of Pittsburgh.

The PC Foamglas used on the roof is a cellular glass insulation composed of millions of tiny air cells fused together to form a continuous structure. Because it is true glass and cellular in structure, Foamglas has a high resistance to moisture and retains its insulating value.

A "glass lid" tops off Pittsburgh's new skyscraper (at left). Above, the PC Foamglas cellular glass insulation being placed on the roof. Warren-Ehret Co. is the roofing contractor.

Portable Elevator

A new portable elevator featuring a rigid triangular tower and remote reverse control has been announced by Wilson-Albrecht Co., Inc., 3565 Wooddale Ave., Minneapolis 16, Minn. The company points out that an operator is not required for this unit since the platform may be preset to stop at desired loading and unloading levels by means of remote control mechanism. The platform may be stopped from any height. Interchangeable power units, both electric and gasoline, are available for use with this Waco elevator.

Able to carry 1,000 pounds at 110 feet per minute, the elevator is also available with a 6-cubic-foot capacity bucket. Pneumatic rubber-tired wheels simplify transporting. The elevator has a built-in patented safety slack brake.

Further information may be secured from the company by requesting Form No. PS-28-A. Or use the Request Card at page 16. Circle No. 455.

Transformer-Type Welder

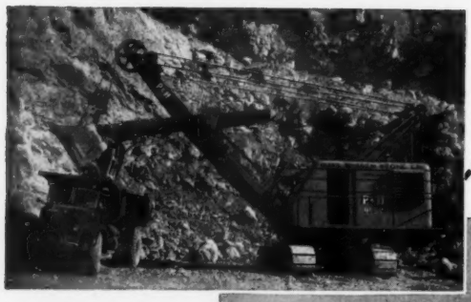
A bulletin describing a complete line of transformer-type welders for all applications of the Heliarc process has been prepared by Miller Electric Mfg. Co., Appleton, Wis. It includes charts, specifications, and recommendations for automatic control panels, and for the Heliarc spot welder.

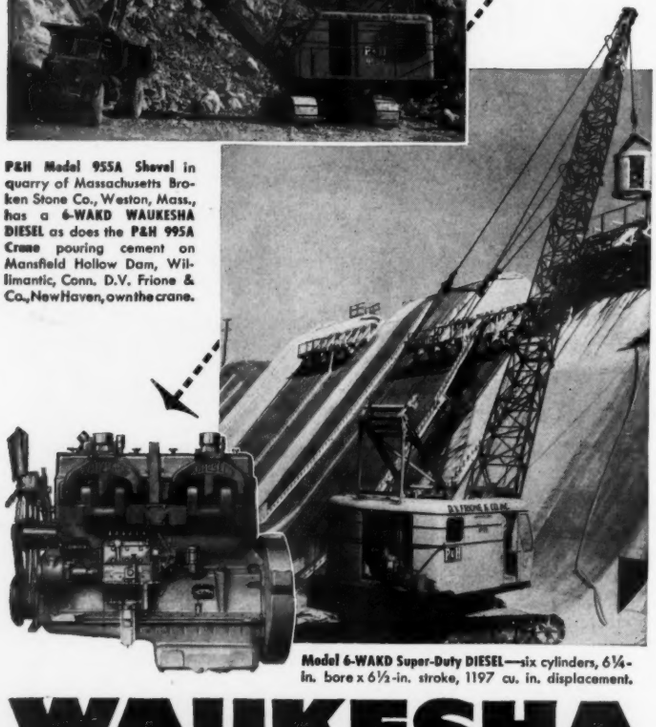
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 452.

Dump-Car Division Moved

The Dump Car Division of the Austin-Western Co., Aurora, Ill., has been transferred to the Eddystone, Pa., plant of Baldwin - Lima - Hamilton Corp., which acquired the A-W assets last March. This move is part of a plan to expand production of motor graders at the Austin-Western plant.

Quarries to Dams-----





P&H Model 955A Shovel in quarry of Massachusetts Broken Stone Co., Weston, Mass., has a 6-WAKD WAUKESHA DIESEL as does the P&H 995A Crane pouring cement on Mansfield Hollow Dam, Willimantic, Conn. D.V. Frione & Co., New Haven, own the crane.

Model 6-WAKD Super-Duty DIESEL—six cylinders, 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displacement.

WAUKESHA Diesel POWER

139

● Trigger quick, but smooth and slick—the Waukesha Super-Duty Diesel snaps right into it, almost the same second the shovel operator puts on the power. It's that *fast recovery* that makes a Waukesha Diesel so different. And you can tell the difference, too—in loads per minute. Operators, contractor-owners, and shovel-makers agree on that. With Harnischfeger Corporation of Milwaukee, Wis., the Waukesha 6-WAKD Diesel is standard equipment on their P & H Model 955A 2½ to 3 cubic yard shovels, draglines, and cranes, that are so versatile on such a variety of construction jobs. Pictures show two of them at work.

Like all Waukesha Diesels, this Super-Duty Six has many exclusive design features. Most outstanding is the patented spherical combustion chamber. That's the *why* of Waukesha Diesels' unusual performance—the lively, responsive acceleration, smooth, shock-free operation, clean and complete combustion with high fuel economy and low maintenance. Get all the details—send for Bulletin 1415.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN
New York • Tulsa • Los Angeles

MESSENGER CONCRETE VIBRATORS and GRINDERS

A few exclusive dealer territories are available.
Messenger Vibrators
FRANK D. MESSENGER
P.O. Box 124
FAIR HAVEN, MICH.
Use "Messenger" Service

JACKMANCO
OUR SEVENTY-FIFTH YEAR
75 Years Young

As we enter our 75th year of manufacture, we are grateful to the many customers and devoted distributors, who have learned that the name JACKMANCO stands for quality of manufacture and superior performance on the job.

WHEELBARROWS
DRAG SCRAPERS
MORTAR PANS
MORTAR MIXING BOXES

CONCRETE CARTS
LAWN ROLLERS
SALAMANDERS

JACKSON MANUFACTURING CO.
HARRISBURG • PENNSYLVANIA

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Surveyors, Mappers Meet in Washington

About 1,000 surveyors, topographic engineers, and other map-making specialists from the United States, Canada, and Latin America gathered at the Hotel Shoreham, June 18-20 for the 11th Annual Meeting of the American Congress on Surveying and Mapping.

Hosts to the visitors were Washington members who are engaged in professional activities with the U. S. Geological Survey, the Coast and Geodetic Survey, Army Map Service, and other government agencies as well as several map-publishing concerns. President of the group is Gerald FitzGerald, Chief of the Topographic Division of the Geological Survey. General Chairman is Alfred C. Stiefel, also of the Survey.

"Surveys and Maps Are the Basic Blueprints for Peace and Development" was the theme of the meeting. After registration and the official opening of the Exhibit Hall on Monday morning, the Congress was addressed by Mr. FitzGerald, followed by a panel discussion by past presidents of the ACSM on the duties and obligations of the ACSM to its members and the profession. Other speakers discussed the role of surveying and mapping in developing the economy of nations and the responsibilities of a new educational venture to a new profession.

That evening each of the six technical divisions of the Congress met concurrently with programs devoted to technical discussion. These continued the following day, with delegates attending sessions on cartography, Canadian participation, control surveys, property surveys, Central and South American participation, and surveying and mapping instruments. The annual banquet was held Tuesday evening at 8 p.m., followed by a dance.

Formation of a new technical division on education under the leadership of Russell C. Brinker, Professor of Civil Engineering at Virginia Polytechnical Institute, was one of the highlights of the meeting. Its objectives will be to broaden and modernize courses in surveying, mapping, and related subjects offered by colleges and universities.

Another special feature was the first showing in the United States of a large exhibit of maps and charts prepared by the principal United States government mapping agencies for display at the Fifth General Assembly of the Pan-American Institute on Geography and History held at Santiago, Chile, in October, 1950. The titles on the exhibits were in English and Spanish. Subjects of Inter-American significance by several speakers from Canada and Latin-American countries were presented at the sessions of the Congress.

Wednesday was devoted to the subjects of education, map appreciation and use, topography and mapping, and international participation.

Welding Design Manual

A new edition of its Manual of Welding Engineering and Design, containing information on topics not previously covered, is offered by Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing, N. Y. The 50-page manual contains articles on joint preparation by means of electric arc; design information; comparative data; reports on welding alloy developments and chemical welding aids developed within the past year; and procedural information.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 499.

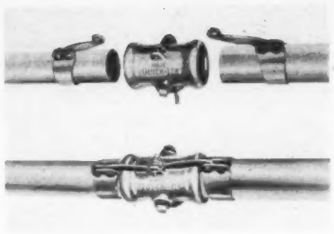
New Quarters for Granco

Offices of Granco Steel Products Co., a subsidiary of Granite City Steel Co., Granite City, Ill., have been moved from the parent company's plant to space in a Dow Chemical Co. building in Madison, Ill. The move affects office, engineering, and executive personnel only. Granco's production of its Corruform and Cofar will continue to be centered in the steel mill.

New Pipe Couplings

New quick-locking coupler equipment designed to speed and simplify setting up, moving, and maintaining portable construction and industrial pipe lines, has been announced by R. M. Wade & Co., 106 S. E. Hawthorne Ave., Portland, Oreg.

The Quick-Lok coupler is designed for a variety of uses: air and water under pressure, oil or gas lines, chemicals, and fuel oils. Easy-access outlets



The Quick-Lok coupler is designed for speed setting up of pipe lines.

for connecting air lines, lateral hose, etc., are provided on each coupler for running hose and other lines.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 503.

Expansion-Joint Filler

Literature about Flexcell, a bituminous fiber expansion-joint filler, is available from The Celotex Corp., 120 S. La Salle St., Chicago 3, Ill. The pocket-size folders describe Flexcell as moisture-resistant and nonextruding. It is said to be light, easy to install, and to provide a finished joint that requires no trimming. The company reports that when compressed 50 per cent, Flexcell recovers upwards to 70 per cent of its original thickness. The bulletin illustrates applications of the product and offers short-form specifications.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 547.

"We have never had a more satisfactory piece of equipment"

LaPLANT-CHOATE MOTOR SCRAPERS

Polk Construction Company
GENERAL CONTRACTORS
LAKELAND, FLORIDA
February 19, 1951

Mr. Troy M. Deal, Jr.,
Sales Manager
Deal Machinery & Supply Co.
Box 1148
Orlando, Florida

Dear Sir:

Your representative, Mr. Charles M. Nolan, has requested that we advise you concerning the service and the operation of our LaPlant Choate TS-300 Scraper.

Since we have had these machines, we have moved several hundred thousand cubic yards of practically all clayings, and stripping at our limerock quarry. We wish to advise that we have never had a more satisfactory piece of equipment. On highway work, railroad gradings, and subgrade work, as well as in the pit, we have never had a more satisfactory piece of equipment. This is evidenced by the fact that we have on file our order for the third unit. We have not offered these for sale to anyone and would not sell them unless they could be immediately replaced.

Yours very truly,
POLK CONSTRUCTION COMPANY
John C. Dickerson

• LIKE the boys at Polk Construction Company —you want *satisfactory performance* from your earthmoving equipment.

What does "satisfaction" mean?

It means the capacity to haul bigger payloads each trip . . . speeds that let you make more trips per hour. It means power to spare in the toughest going . . . power that's *useable* in the pit, on the haul road, on the fill. It means dependability . . . the ability to keep up the pace shift after shift.

In a word, *"satisfactory equipment" means LaPlant-Choate Motor Scrapers!*

Your LPC distributor can give you facts and figures on Motor Scraper performance . . . see him before you bid on your next job. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

On this Polk Construction Co. job at Minneola, Florida for the State Road Dept., yardage ran over 300,000 cubic yards. Part of the job included clay stabilization work with hauls up to 5 miles one way. With heaping 14-yd. payloads, the Motor Scrapers made the 10 mile load-haul-spread cycle *at an average speed of 14 mph!*

LaPLANT CHOATE

Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type tractors.

2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.

Hydraulic and Cable-operated Dozers.

New Link Under Way On Cross-State Road

Mississippi Grades 8½-Mile Stretch of Route 26 North of and Parallel to Gulf Coast Highway; Pave Next Year

(Photo on page 1)

• THE Mississippi State Highway Department is grading, this year, an 8½-mile section of State Route 26 in Stone County, beginning on the east of Wiggins and continuing westerly to Wiggins, county seat of Stone County, on U. S. 49. The stretch of State Route 26 east from this new section to Lucedale is complete with blacktop pavement. (see C. & E. M., May, 1950, pg. 57).

West of Wiggins, State 26 is gravel for 32 miles to Poplarville on U. S. 11. Eventually Mississippi State Highway engineers expect to see this cross-state road entirely hard-surfaced, thus providing a needed alternate route to east-west U. S. 90 which follows along the Gulf Coast. The latter highway, the historic old Spanish Trail, is badly overcrowded, and an alternate route between Mobile and New Orleans, avoiding the congested Mississippi coastal municipalities, is sorely needed.

Work on the new 8½-mile project got under way last March after the Highway Department awarded a contract for the improvement to Pigford Brothers Construction Co. of Meridian, Miss., on its low bid of $209,898. The job, which includes grading, drainage, culverts, and bridges, is expected to be finished early in the fall, provided structural steel for the bridges is available according to schedule. The required I-beam members were expected to be delivered after the June rolling.

50 Per Cent New Location

The existing road was a traffic-bound gravel 24 feet in width to the edges of roadway. The new alignment follows the old road for about half its length, and is on new location for the rest of the distance. A minimum 100-foot right-of-way is provided. The maximum horizontal curve is 2 degrees, designed for speeds of 45 mph, while the vertical curves provide for sight distances of 800 feet.

Roadway width is 30 feet, with a crown of 5 inches at the center. In fill sections the sideslopes are either 2 to 1 or 3 to 1. In cuts the front slopes are 4 to 1 to a flat ditch 4 feet wide and with a minimum depth of 2 feet. Backslopes are 2 to 1. About two-thirds of the road length is covered with select topping material of variable depth but averaging 12 inches in thickness.

Two good-size bridges are in the contract, one with seven 30-foot spans totaling 210 feet, and the other 60 feet in length made up of three 20-foot spans. Steel-pile bents support I-beam stringers and a concrete deck. A third large structure is a reinforced-concrete double 10 x 6-foot box culvert. RC culvert pipe, from 18 to 48-inch diameter, totals 1,600 linear feet. Headwalls of concrete were poured with 2-bag mixers.

Grading

Unclassified excavation in the earthwork item totaled 175,000 cubic yards, and balanced out evenly between the roadway cuts and fills. In places the maximum vertical dimension in cuts and fills was 15 feet, with the average over the job being about 7 feet. Roadway material was moved 700 to 800 feet on the average, the maximum haul distance being in the vicinity of the bridges where dirt was moved as much as 2,200 feet. At these two locations muck was removed over areas about 300 feet long, and backfilled with sandy material. A dynamite item for blasting the muck was provided in the contract, but the contractor elected to excavate it with a dragline instead.

Aside from the muck, practically all the roadway excavation consisted of a sand-clay soil that was easily handled. In a few places where a less desirable soil was encountered, this material was always maneuvered so that it was placed at the bottom of the fills.

On the grading the contractor used four Caterpillar DW10 rubber-tired tractors pulling Caterpillar No. 10 scrapers that had their sides built up to carry 10 instead of 8 cubic yards. He also employed a single Caterpillar 12-yard scraper hooked to a D8 crawler tractor. These hauling units were push-loaded by a D8 and a D7 tractor. Muck removal was handled by a Link-Belt 1-yard dragline. Later, as a crane, this same rig will be used in the construction of the bridges.

Roadbed Topping

The scraper units did precision

(Concluded on next page)

Beauty **plus STRENGTH with LACLEDE STEEL JOISTS**

Architect: Albert Anis
Gen'l Contractor: Edw. M. Fleming Construction Co., Inc.

Combining structural strength with design flexibility, Laclede steel joists played an important role in the construction of this modern new Biscayne Terrace Hotel in Miami, Florida.

Careful control of quality from open hearth to finished product in the modern Laclede mills is your assurance of dependable quality when you specify these Laclede construction steels:

Steel Joists • Welded Wire Fabric • Corrugated Centering • Multi-Rib Round Reinforcing Bars • Accessories
Spirals • Pipe and Conduit

LACLEDE STEEL COMPANY
Producers of Steel for Industry and Construction
St. Louis, Mo.

for FASTER BETTER SOIL COMPACTION

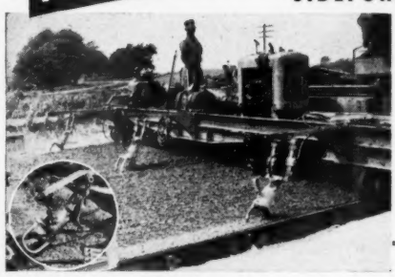
Specified densities are quickly reached in granular soils with the Jackson Vibratory Soil Compactor. For those areas adjacent to structures, bridges, culverts, in trenches, factory floors and earth fill dam construction, there is nothing that begins to equal the Jackson Compactor for speed, convenience, and thoroughness of compaction. Self-propelling, the operator merely guides it. Send us a sieve analysis or small sample of the soil, and we will tell you what you can expect in percentage of A.S.S.H.O. densities and depth of compaction.

JACKSON VIBRATORY EQUIPMENT

for MORE YARDS OF MUNICIPAL CONCRETE PAVING, HIGHWAY WIDENING, BRIDGE DECKS, ETC.

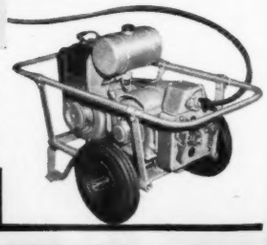
The Jackson Electric Vibratory Screed strikes off to any crown, undercuts at curb or sideform, works up to and around all obstructions. Permits pouring slabs up to 30' without center joint. Requires only two men on widest slab and is the only screed that can be rolled back for second passes on 4 rollers. Powered by Jackson 1.25 KVA Power Plant. Write for details.

for PERFECT VIBRATION OF CONCRETE AT SIDEFORMS and ELIMINATION OF MANUAL LABOR



The Jackson Side Form Vibrator mounts on any standard finisher or spreader; employs two or more vibratory units, raised or lowered by finisher operator, which operate close to forms or reinforcement and will ride over any obstruction without fouling. Long-wearing, reliable. Saves better part of 2 men's labor. Write for details.

PORTABLE POWER



Plants of 1.25, 2.5 and 5 KVA to operate all Jackson Vibratory equipment and other tools and lights. Ideal Vibrators for all types of concrete construction
FOR SALE OR RENT AT YOUR JACKSON DISTRIBUTOR

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON, MICHIGAN

C. & E. M. Photo

A Caterpillar D7 push-loads a DW10 and a No. 10 scraper on Pigford Brothers grading job on Mississippi State Route 26.

spreading, laying the material on the fills in even 6-inch lifts that required no further dozing. Two Caterpillar dual tamping rollers compacted the fill lifts, one set being pulled by a Minneapolis-Moline rubber-tired tractor, and the other by an International TD-9 crawler tractor. Fills were rolled until they reached a density of 95 per cent Proctor at optimum moisture. Because of the normally wet earth as it was taken from the cuts, no watering of the fills was required.

Select topping material for the roadway was obtained from two borrow pits —one adjoining the right-of-way and the other about ¾ mile off the highway. The material has a plasticity index below 8, and is composed chiefly of sand with just enough clay to compact and set up readily. The DW10 units hauled the topping, the average distance from one pit being 2 miles, and from the other 2½ miles.

The select topping was spread in 6-inch lifts and compacted by the tamping rollers to a density of 95-100 per cent of Proctor. Only in those areas where the roadbed material was suitable throughout was the topping dispensed with. Traffic through next winter will compact the roadway still more in preparation for the blacktop paving which will be awarded under a future contract. As a final step in the present operation, the subgrade is shaped by a Caterpillar No. 12 motor grader. Traffic was maintained throughout the construction either on the old road or on short detours that were available.

Quantities and Personnel

The major items included in the 8½-mile grading contract were as follows:

Unclassified excavation	175,000 cu. yds.
Structural excavation	1,000 cu. yds.
Roadbed topping	44,000 cu. yds.
Culvert concrete	530 cu. yds.
Reinforcing steel	35,155 lbs.
RC pipe, 18 to 48-inch	1,600 lin. ft.

Pigford Brothers Construction Co. employed an average force of 25 on the contract under the supervision of J. C. Gressett, Superintendent.

For the Mississippi State Highway Department B. C. Batson is Project Engineer assisted by S. L. Scott. The project is located in the Hattiesburg District of which George L. Lemon is District Engineer. The Department is headed by R. A. Harris, Chief Engineer; S. A. Tomlinson, Jr., is Construction Engineer.

Rust-Protective Paint

Literature describing Ebony paint, a coating designed to seal a surface under a smooth, tough, rust-resistant film, is available from Ebony Paint Mfg. Co., 18th and Agnes Ave., Kansas City 1, Mo. It points out that Ebony paint is not an oil paint; it is non-evaporating and leaves no pores. The 4-page brochure cites a number of applications for Ebony paint and highlights the company guarantee of protection against rust.

This literature and a free quart of paint may be obtained from the company, or by using the Request Card at page 16. Circle No. 496.

Single-Pass Gravel Plants

Literature featuring new single-pass gravel plants has been announced by Diamond Iron Works, Inc., 18th Ave., North & 2nd St., Minneapolis 11, Minn. Three plants with a capacity range from 20 to 65 tons per hour are covered in bulletin CP-1. A complete description of the basic units comprising the plant, outstanding features, its uses and full specifications are included for each of the models.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 502.

NO TIME LOST!
LOADING OR LAYING ITS LOAD

A STANDARD STEEL PRESSURE DISTRIBUTOR GIVES EQUAL CIRCULATION THROUGHOUT THE SPRAY BAR FOR A UNIFORM SURFACE FROM CURB TO CURB FOR LONGER WEAR

STANDARD STEEL
PRESSURE DISTRIBUTOR

The Model 424 can be loaded in quick time for a "fast getaway". A two-way cleaning system guarantees a clean spray bar at the end of the day. First, the material is sucked out of the bar and back into the tank. Then by turning one small valve, cleaning solvent is released into pump and spray bar (without contaminating the asphalt in the tank). No time lost in tinkering — no time lost in loading — Standard Steel 424 keeps going all day long far ahead of the "gravel gang"

WRITE FOR CATALOG 424

OTHER PRODUCTS OF STANDARD STEEL

Maintenance Distributors, Tar Kettles, Patch Rollers, Supply Tanks, Tool Heaters, Asphalt Tools, Street Flushers, Construction Brooms.

Built to the Highest Standard

Standard Steel Works NORTH KANSAS CITY, MO.

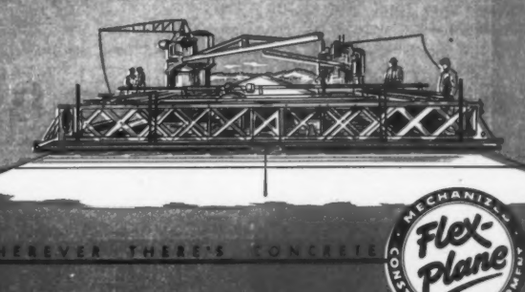
Rising costs of labor and materials are nothing to joke about. It's a situation that calls for action. That's where FLEX-PLANE fits in.

FLEX-PLANE automatic equipment — finishers, curing machines, joint installers,

"It's no Laughing Matter!"

dowel bar installers and traffic line installers are unsurpassed when it comes to working concrete faster at less cost.

Like many others — who are entering low bids without sacrificing quality — you can combat high costs by writing *The Flexible Road Joint Machine Company, Warren, Ohio,* for the latest in concrete working equipment.



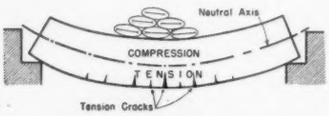
WHEREVER THERE'S CONCRETE

MECHANIZED CONSTRUCTION EQUIPMENT Flex-Plane

Prestressed Concrete: Its Future in the U. S.

(Continued from page 3)

poses: wall panels, floor and roadway slabs, columns, foundations, etc; its deficiency is most apparent in beams and girders. Here the reinforced-concrete member must withstand flexural stresses.



An ordinary concrete beam flexes under loading, inducing compression in the top and tension on the lower fibers. Unable to resist tensile forces, the beam will crack across the bottom.

Set in normal horizontal position with loads of one type or another across the top, a beam flexes downward. In bending, the upper fibers are shortened, inducing compression, and the lower fibers are elongated, producing tensile stresses. The compressive strength of the concrete easily assumes the positive load on the upper fibers, but its weakness in tension prevents it from taking any of the tensile load on the lower fibers. The steel rods in the lower portion of the beam take all of the tensile forces and in so doing are lengthened. The concrete, bonded to the steel, does not have equal elasticity and is unable to "stretch". It therefore cracks. Since these cracks often extend up to the neutral axis, the concrete in the lower half of the beam has little structural use.

Concrete also has poor resistance to shear, especially when accompanied by tension. This necessitates designing very thick webs, thereby increasing the dead weight. In spite of the use of deep beams, thick webs, and steel reinforcement, the concrete will crack across the lower flange even without loading. In hardening, concrete shrinks. It is free to do so in the upper portion of the beam but not in the lower part where the steel resists this shortening of the beam. The disproportionate shrinkage bends the beam and causes cracks on the lower side.

These statements are not made to discredit reinforced-concrete design, but only to show that the properties of concrete and steel can be improved and more economic use made of them.

The Basic Principle

Bearing in mind that most of the undesirable properties of concrete in structural use stem from its weakness in tension, we can easily see how prestressing improves its value. The word prestressing, though now established by common usage, does not exactly describe what is done to the concrete. It is really precompression which is exerted on the concrete member. Regardless of the method used, by one means or another a large compressive force is applied to the concrete prior to its use in service, and is maintained to some degree throughout the life of the structure. This precompressive force is made large enough so that the tensile forces induced by working loads only reduce the total compressive force and are never so great as to place the concrete in tension.

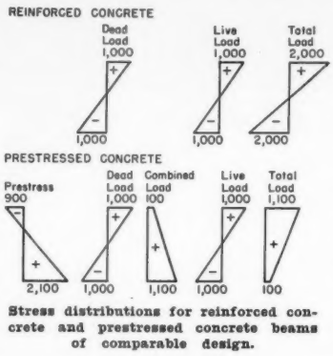
Stress Distribution

Before examining the methods which have been developed here and abroad to precompress a concrete member, let's take a hypothetical case to compare the various stresses imposed on a reinforced-concrete member and a prestressed-concrete member by the same loading.

For convenience we will assume that the live load is uniform along the length of the beam and equal to the dead load; further, that each alone induces a maximum flexural stress of 1,000 psi—compression in the top fiber and tension in the lower fiber. Since no other forces act on the standard reinforced beam, we have total maximum stresses of 2,000 psi.

For the prestressed beam let us assume that there is no steel whatever in the concrete; that the precompressive force is applied externally, perhaps by jacks fitted against rock abutments. So as not to favor the prestressed beam, though we know that it will weigh less, we will assume the dead weight to be the same as that for the standard beam.

When the concrete has hardened sufficiently in the forms, the jacks are used to apply a positive pressure to the ends of the beam at some point below the center line. The eccentricity of this force will cause the beam to arch upward. As the beam leaves the base of the form, the dead load comes into play, it and the precompressive force both acting at the same time. The compressive force is continued beyond the point of taking the full dead load to some point



Stress distributions for reinforced concrete and prestressed concrete beams of comparable design.

where the entire beam is in compression. Because of the eccentricity of this force, the stress in the lower fiber will be greater than that in the top—in our example, 100 psi in the top fiber and 1,100 psi in the lower fiber. Maintaining this condition and applying the live load for which the beam is designed will serve only to reduce the compressive stress in the lower fiber. By proper design the stress at all sections will always be compressive and greater than zero. This example, reduced to simple form, serves to illustrate the point.

Essentially Two Methods

The essential difference between the various methods of precompressing is the way they are applied to the member. This may be done by pre-tensioning or post-tensioning, the prefix indicating whether the steel is tensioned before or after the concrete has been placed.

In pre-tensioning, the compressive force is applied to the concrete member through the action of bond. High-strength very thin steel wires are strung between abutments, one fixed and one movable. The wires traverse the length of the form and are fixed in position by holes in the abutments. When the movable abutment is forced away from the other, a stress of up to 200,000 psi can be induced in the wires. With the wires held in this condition, concrete is

(Continued on next page)

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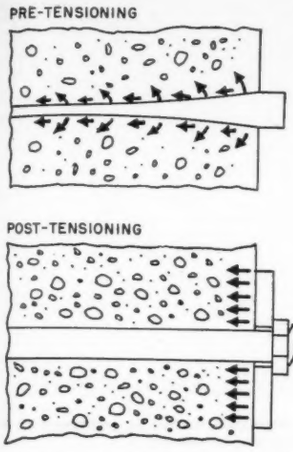


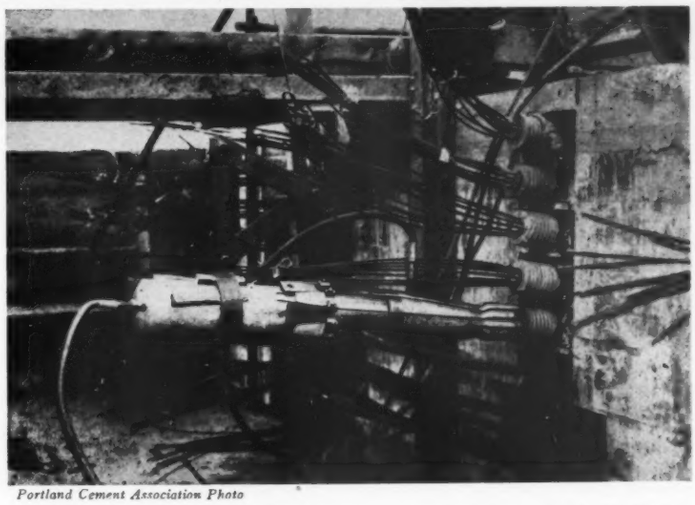
Arrows indicate the manner in which the compressive force is induced with pre-tensioning and post-tensioning.

poured and vibrated into the form. When the concrete has hardened sufficiently the wires are cut from the abutments. They want to snap back into position to resume their initial length, but the bond of the concrete along their full length prevents their doing so. By this action a tremendous compressive load is placed on the concrete member.

In post-tensioning, the compressive force is applied to the concrete through bearing plates at the ends of the beam. Prior to pouring the concrete, hollow ducts are placed in the form. After the concrete has hardened these are withdrawn. The wires are threaded through the passage and fixed at the ends to some form of jack. Braced against the ends of the beam, the jack stresses the wires to 120,000 psi. Under this stressed condition they are wedged against an anchorage plate. When the jack is released, the stress in the wires is transferred to the bearing plates and thence to the concrete member.

But Many Variations

There are more than a dozen methods for prestressing at the present time. With the increasing interest of American engineers and contractors, we may look forward to new ones in the near future. If prestressed-concrete construction is to be advanced in the United States, it is important that contractors and their top-level personnel take an interest equal to that of engineers in adapting this technique to American building methods.



Portland Cement Association Photo

The Freyssinet method of prestressing uses a cable composed of 8 to 18 wires. Here a jack grips the wires and its center ram wedges them into the cylindrical anchorage cones—securing all wires under load.

It is impossible, of course, to discuss all of the methods in detail. The Freyssinet and the Magnel-Blaton methods are of great interest because of their wide application in Europe. The Hoyer and Shorer methods lend themselves to prefabrication in concrete plants and may one day be developed to the point where a contractor can purchase prestressed-concrete members as easily as he does steel. The newly developed methods of Billner and Roebling show what can be done by Americans to simplify design and construction. Also worthy of note are the ideas of Billner and Carlson for electric prestressing and of Abeles for partial prestressing.

Freyssinet

The Freyssinet method uses a cable composed of 8 to 18 wires, all separated and spaced by a spiral core. The cable is either inserted through holes formed in the beam by hollow ducts, or is protected by plastic sheaths and placed in the form before the concrete is poured. The cable is locked in place by a wire-gripping device at one end of the beam, and passes loosely through a similar device at the other end. This device consists of a cast concrete cylinder with a tapered hole through its length, and a cast conical plug. Both are bound by spirally wound wire for added strength and gripping properties. The cylinder is cast into the end of the concrete beam at the time of pouring. All wires pass through the tapered hole and are lightly held in place by the conical plug.

After the concrete has hardened sufficiently, all wires in the cable are gripped by a jack and stressed to a load of about 125,000 psi. A center ram in the jack then drives home the conical wedge—securing all wires under load. The compressive force is transferred to the concrete when the jack is released. A rich mortar is then injected through a small hole in the plug, to protect the wires against corrosion.

The features of this method are that all wires are stressed at the same time, reducing cost; the anchorages are set in the beam and do not protrude at the ends; and the stress on the beam is uniform. The disadvantage is that by stressing all wires at one time it is not certain that they will all have the same stress. If there is slippage of one wire in the wedge, the entire job must be

(Continued on next page)

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Prestressed Concrete: Its Future in the U. S.

(Continued from preceding page)

redone. Though the technique described is for prestressing a simple beam, it can be modified and extended to serve many kinds of concrete structures. So too with the other methods which follow.

Magnel-Blaton

In the Magnel-Blaton method the cables are composed of series of wires spaced in vertical and horizontal rows. There may be as many as 8 wires per layer and 64 wires in all. The gripping device at the end of the beam consists of steel bearing plates laid one upon the other like a sandwich. Each plate has four wedged-shaped slots. Two wires are strung through each slot. When stressed to the proper point, they are secured in place by a steel wedge driven into the slot by a hand hammer. This process is repeated for all wires in the cable. The precompressive force is transferred through the sandwich plates to the end bearing plate, thence to the concrete member.

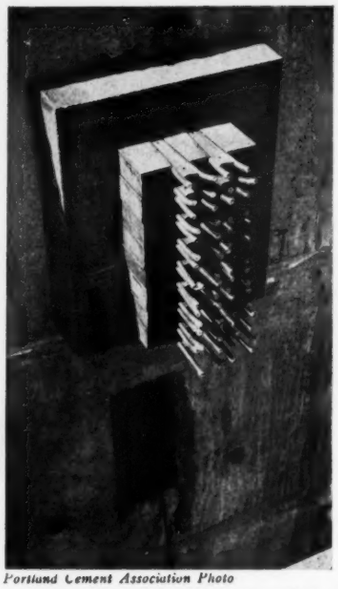
The advantages of this method are as follows: stress in the wires is uniform; since only two wires are stressed at a time, simpler and smaller jacks can be used; because some 64 wires can be used in one cable, the total compressive force is large and quite suitable for long span beams. The drawbacks are the greater time required for stressing and the resulting greater cost; the extension of the sandwich plates beyond the ends of the member; and the high cost of threading individual wires through spacer plates set 5 feet apart within the cable.

Some refinements have lately been introduced in the Freyssinet and the Magnel-Blaton methods. The use of a rubber tube to form the cable holes in the beam is a great improvement over the use of a plastic sheath, metal duct, or bituminous coating on the cable. The rubber mandrel is inflated with a tire pump to about 40 psi and placed in the form. When the concrete has set, the tube is deflated and easily withdrawn, leaving a duct through the member.

There is another feature to this besides its simplicity. It provides a means of obtaining the added strength of bonding. Even though Freyssinet's and Magnel's methods are based upon the ability of end anchorages to secure the wire and transmit its compressive load to the concrete, it is the practice to inject a rich grout into the cavity to protect the wires from corrosion. This bonds the wires to the concrete, and though not relied on, has been shown in tests on certain beams to be strong enough to carry normal working loads even after the anchorages have been broken off.

Hoyer

The Hoyer system is based solely on bonding forces, and its particular fabrication method adapts it more to the factory than the field. In a typical factory the beam molds are set end-to-end for a length of 400 to 1,000 feet. The wires are separated by spacers at the ends of each mold and are fixed to anchorages at the very ends of the line. Because of the extreme elongation required to stress wire of these lengths, the jacking must be done in stages. After the wires are stressed to the desired limit, concrete is poured and vibrated into place. The jacks hold the wires under stress until the concrete is fully hardened. When the jacks are released, the bond of the concrete prevents the wires from assuming their original length and the concrete is thereby placed under high compressive loading. Since the compressive force is the result of bond and is uniform throughout the length of the line, individual beams can be simply sawed or flame-cut to desired lengths. Each section is then a prestressed member in itself.



Portland Cement Association Photo

Feature of the Magnel-Blaton method is the sandwich-plate gripping device at the end of the beam. This one was photographed on the Walnut Lane Bridge in Philadelphia.

The benefits of this system are obvious. It permits assembly-line production of prefabricated concrete members. There is a reduction in cost by using centralized equipment. The plant control should assure ideal mixing, placing, vibrating, and curing. It also offers an opportunity to use a vacuum process of dehydration, to train and control labor forces, and to standardize design. The problem is, of course, to establish a market for the products and to finance the cost of the plant.

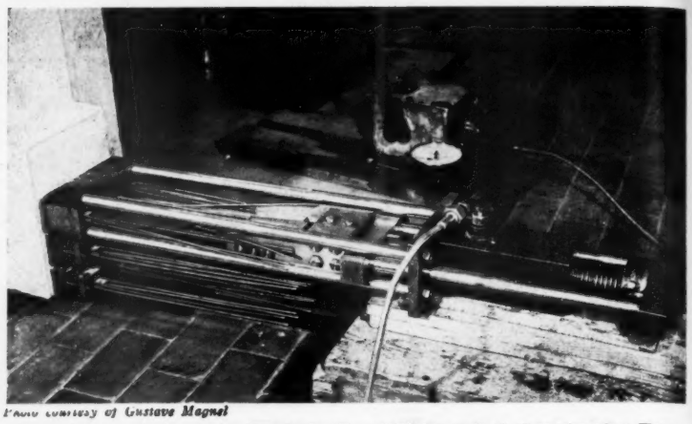


Photo courtesy of Gustave Magnel

Two wires are stretched at a time in the Magnel-Blaton method of prestressing. Here a 5-ton hydraulic jack does the stretching.

Shorer

The Shorer method is also based on the bonding action of the wires, but varies in many respects from the Hoyer method. Its central feature is a high-strength steel tube used as the bearing area for the jacking. The prestressing wires are wound about the tube with a very wide pitch, half in one direction and half in the other, and are kept about 3/16 inch away from the tube by disks spaced along its length. A special patented device at the ends of the tube secures the wires and enables the jack to bear against the tube

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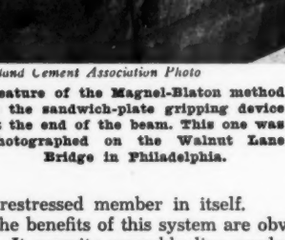

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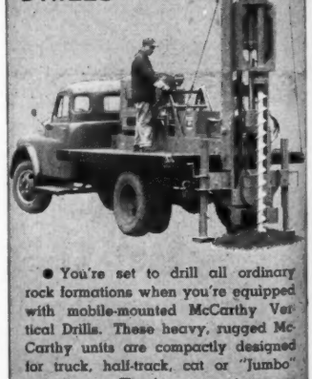

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during the prestressing operations. When the wires are fully stretched they are locked in place and the jack is removed. The entire unit, tube and wires, is then set in the form much as it is in standard reinforcement.

In this condition the steel tube takes the entire compressive load—anywhere from 2 to 20 tons. After the concrete has been poured and vibrated, and has hardened, the wires are unlocked from the ends and the tube, which has been coated or wrapped with paper to prevent bond, is withdrawn from the concrete. The wires, however, are fully bonded to the concrete, and when released from the tube they transfer the entire compressive stress to the member. The hole left by the tube is usually grouted. The chief advantage of the method lies in the elimination of expensive abutments required by the Hoyer method. Bond is also better, due to the spiral course of the wires.

Billner

Billner's method uses high-strength large-diameter wires. These are anchored within the concrete member by forming large loops at each end of the beam. Except for the loops, the wires are fully coated with a material, such as asphalt, to prevent bond. The wires are then placed in the form and concrete is poured. A thin comb-like partition separates the beam at midsection. When the concrete has hardened, two separate units are formed, connected only by the wires which pass from one half to the other. The wires are stressed by jacking the two units apart. They are held in this position while the separating plate is removed and high-early-strength mortar is injected into the opening. After this has hardened, the jacks are released and the effort of the wires to resume their original length prestresses the beam.

Perhaps it should be mentioned again that these methods may be used for concrete members other than beams. Billner's method is well adapted to slab construction. In this case the slabs can be separated to obtain prestress by applying a vacuum holder to each half. Hydraulic jacks placed between the holders can then force the slabs apart. The holders can also be fitted with a lip to grip the concrete at the separation, adding to their holding capacity.

Roebling

The basic feature of the Roebling method is the precision manufacture of the cable, a galvanized bridge strand with swaged fittings at the ends. The strand is made entirely in the wire-rope plant and can be composed of almost any number of wires. The slim cylindrical-shaped fittings are also applied in the shop, and in the process are proof-tested appreciably above working loads. The end fittings are threaded to permit attachment of a stud which is used to secure the cable to the end bearing plate.

The prestressing can be done on or off the site and applied to cast-in-place or precast concrete. For poured-in-place concrete the strands are covered with some bond-preventing material such as plastic tubing or Sisalkraft paper. The strand is coated with grease prior to applying the paper and binding with twine. The strand is then placed in the form and is embedded in the concrete during the pouring operation. When the concrete is cured to required strength the strands are ready for post-tensioning.

With precast concrete, box-shaped blocks can be strung on the strand like beads, each block mortared to the previously placed block. When the final block is in place, an initial tension is applied and the mortar is permitted to set and cure. The total prestress is applied for both cast-in-place and precast construction by grasping the end stud in a center-hole jack and pulling the strand to the desired length. The load is held while a nut, previously placed on the stud, is run up tight against the end bearing plates. When the jack is released, the attempted shortening of the strand compresses the entire member.

The advantages of this method are that the cables and fittings are manufactured under controlled conditions and are proof-tested before use; the prestressing method is quick and simple; and either cast-on-site or precast products can be used, whichever best suits the purpose.

Photo courtesy of Gustave Maynel

Some prestressing methods are better adapted to the factory. This one contains four 250-foot production lines on which prestressed concrete products can be made.

Other Methods

There are two other methods, or ideas, which are noteworthy. The first of these is prestressing electrically, developed by Billner and Carlson. This method requires the use of steel bars, coated with some thermoplastic material such as sulfur or a low-melting alloy. The bars are placed much as they are for standard reinforcement except that their threaded ends protrude from the ends of the beam. The concrete is poured and allowed to harden. Then an electric current of low voltage but high amperage is passed through the bars. The high current heats the bars and causes an appreciable lengthening. Nuts on the threaded ends of the bars are then run up tight against steel bearing plates. During the heating the thermoplastic material melts, destroying bond and permitting the extension of the bars. As the steel cools it contracts, inducing a high compressive force in the concrete. At the same

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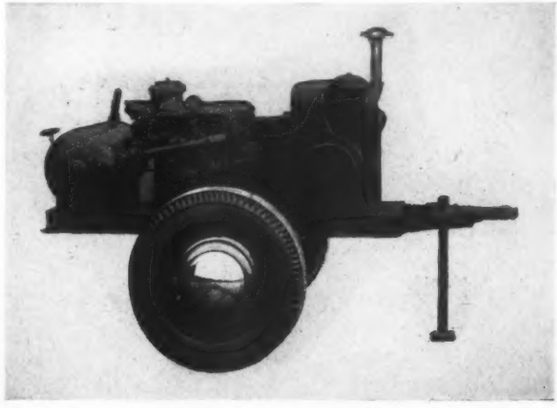

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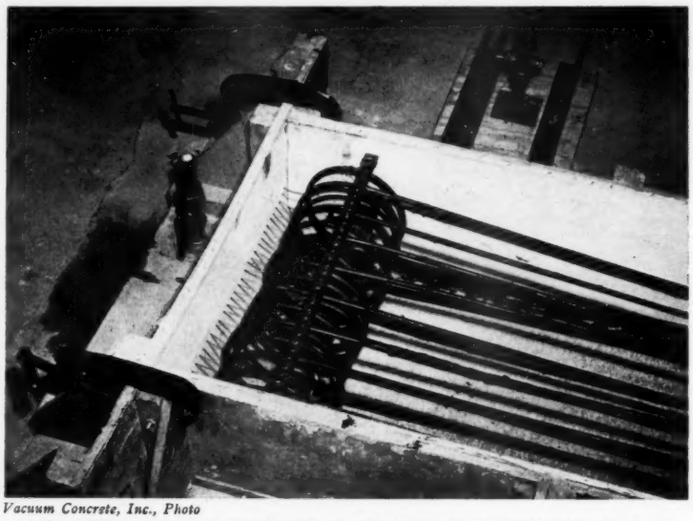
(Continued from preceding page)

time the coating resolidifies and bonds the steel and concrete.

Concerning partially prestressed concrete, it is Abeles' idea that certain economies can be effected by not tensioning all of the reinforcing steel. Partial prestressing permits a reduction in the depth of the beam and eliminates anchorages and necessary jacking for as much as 40 per cent of the tensile reinforcement. The idea is that the beam need not be prestressed for the maximum working loads, since they occur infrequently during the life of the structure. He suggests prestressing the beam to take care of dead weight and only a moderate portion of the live load. Of course some cracking may occur when maximum working loads are applied. However. on removal of this load, the cracks will be sealed by the residual precompression. Abeles explains that absence of cracks can be assured if the tensile stress does not exceed 70 per cent of the modulus of rupture for sustained loading, or 50 per cent of the modulus of rupture if fatigue is introduced by repeated loading. The point is that, except for cases where the structure must be watertight, there is no harm in permitting the instantaneous development of very minute cracks.



Vacuum Concrete, Inc., Photo

In the Billner method of prestressing, all wires except the end-forming loops are coated to prevent bond.

Applications of Prestressing

Having discussed in some detail the various methods of prestressing concrete, it is interesting to examine structures that have been built with this material. As pointed out earlier, the applications extend to virtually every type of construction. Certain types are adapted more to one method than another, as examples will show. Though the majority of the structures were designed and built in Europe, there is no question that they *could* have been built in this country equally well.

Bridges

Since many bridges are designed as simply supported beams, it is not surprising to find this type of structure the first to use a prestressed design. Prestressed-concrete beams, girders, and floor slabs have been used for bridges of almost every size—from 20-foot total lengths to clear spans of nearly 250 feet, from pedestrian footbridges to 6-track railroad bridges.

There are at present two good examples of prestressed-concrete bridges in the United States. They serve to show the range in sizes which may be built and the differences in the methods used. These are the Madison County, Tenn., bridge and the Walnut Lane Bridge in Philadelphia.

The Tennessee bridge has a center span of 30 feet and two end spans of 20 feet, each simply supported. It has a 19-foot roadway and is designed for H-10-44 loading, or one H-15 truck. The beams were assembled on a slab in the county shop, using 8x16x12-inch precast blocks mortared together side by side. The prestressing strand (Roebling) was made of seven $^{9}/_{16}$-inch galvanized wires. Two strands were used for the 30-foot span; one for the 20 foot spans. After prestressing, the beams were trucked to the bridge site. Each beam was fully self-supporting and was easily placed in position by a crane. Additional strands were strung through holes in the sides of the beams for transverse prestressing of the entire group. All beams had a slight lip on the bottom so that when they were placed side by side there were 2 inches of free space between them. A concrete slab was poured over the beams, filling the openings and forming for all practical purposes a monolithic structure. After the concrete had hardened, the transverse cables were prestressed.

There are several things to be said about this structure. For one, it was designed by an American consulting engineering firm, Bryan & Dozier, Nashville, Tenn., and it used standard materials. Second, it is estimated to have saved 40 to 50 cents per square foot over other permanent-type designs. Third, it is a type of structure in great need. Many small-span bridges are needed to replace deteriorated or obsolete timber and reinforced-concrete bridges throughout the country. The prestressed bridge lends itself well to partial prefabrication in highway department shops, and shipment to the required sites. At the present time there are plans to build this type of bridge in other states, and this could go a long way in helping to bring highway structures up to date.

The Walnut Lane Bridge is typical of long-span prestressed structures. It is composed of a 160-foot center span of 13 girders and two 14-foot approach spans with 7 girders each. All girders

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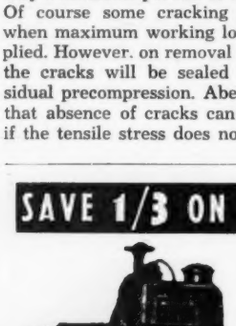

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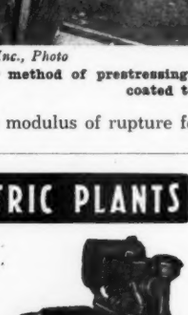

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These four hinged teeth dig in and rip only when the tractor backs up. They make blading easier and faster because they rip out rocks, roots and hard ground, enabling the tractor to work a *full blade* with *less horsepower* on its next trip.

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are of the same cross section, I-shaped beams 6 feet 7 inches deep. Each girder for the main span weighs 150 tons. The cables (4 in each girder) are composed of sixty-four 0.276-inch-diameter wires. The prestressed concrete girders were built and erected by The Preload Corp. of New York and followed the Magnel-Blaton method. Within the limitations placed on designs by the Art Jury of the City of Philadelphia and the natural conditions of the site, the prestressed design offered a saving of 30 per cent.

Though this structure is typical of long-span designs, it is by no means the limit of clear spans. Prestressed-concrete arch bridges with a span of 242 feet 9 inches have been built over the Marne River in France. The 26-foot width of these bridges is supported by six I-shaped prestressed beams. Their depth at midspan, including the road surface, is an unbelievable 3 feet 1 inch. A great achievement in architecture as well as engineering, these long graceful structures have a depth-to-span ratio at midpoint of 1:79.

Many other bridges have been built of prestressed concrete or prestressed components: a 210-foot-span suspension bridge over the Rio Paz in Central America; a 66-foot railway bridge carrying a 6-track railroad in Brussels, Belgium; a continuous-girder highway bridge with two main spans of 206 feet over the river Meuse at Sclayn, Belgium; and others too numerous to mention.

Buildings

In Europe the prestressing technique has been extended to girders, beams, and floor slabs for buildings such as stores, factories, warehouses, hangars, etc. In many cases the prestressed design was selected in competition with steel, reinforced concrete, and timber designs.

One of the largest jobs was the construction of a one-story textile factory in Ghent, Belgium. This building covers an area of 375,000 square feet. The 67-foot main girders were cast on the ground and hoisted into position. Supporting column brackets were formed monolithically with the heads of the columns. Each girder carries ten beams which span 45 feet in a perpendicular direction. These in turn carry 12-foot RC secondary beams. The main girders are I-shaped, 5 feet 9 inches deep, and are prestressed by three cables in the lower flange.

This job is surpassed in size by the 165-foot girders required for an airport hangar at Brussels, Belgium. These huge members are box-shaped, with seven 60-wire cables inside. Each girder required 148 cubic yards of concrete, 6 tons of reinforcing steel, and over 6 tons of high-strength prestressing wire. The girders were made on the ground and jacked into place. The prestressed-concrete structure—awarded in competition with steel and RC designs—was not only economical, but also required the least height—an important factor for an airport.

Though all existing prestressed-concrete buildings use simply supported beams and girders, construction is no longer limited to this design. Advances in the field enable design of continuous beams and rigid-frame structures.

In the city of Chicago a 3-inch fill-supported jointless floor 150x100 feet in area was constructed by Roebling

(*Continued on next page*)

John A. Roebling's Sons Co. Photo

The Roebling method uses a simple hydraulic jack to stress one or two strands at a time. Note the simple end connection of the finished beam at the left.

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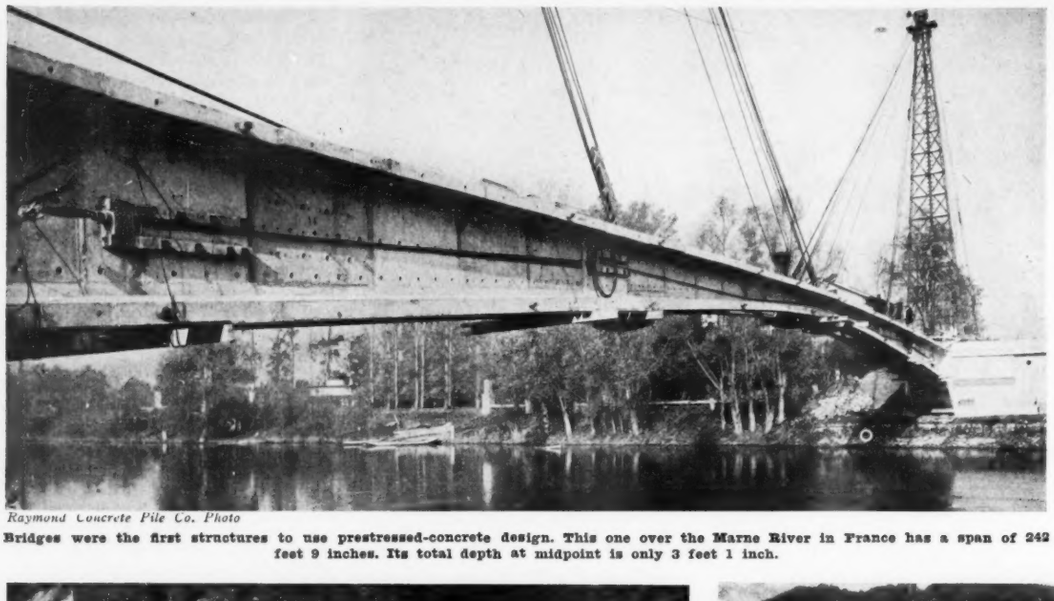


Raymond Concrete Pile Co. Photo

Bridges were the first structures to use prestressed-concrete design. This one over the Marne River in France has a span of 242 feet 9 inches. Its total depth at midpoint is only 3 feet 1 inch.

Prestressed Concrete: Its Future in the U. S.

(Continued from preceding page)

engineers for one of the company's warehouses. The slab is prestressed by two layers of galvanized bridge wire, 4½ inches on centers in one direction and 14 inches in the other. Bond is prevented by paper covering the strands. The concrete was stressed to 600 psi in both directions. In service since 1946, the floor slab (more correctly, the elastic mat) has remained crackless under heavy concentrated loads. The general design of this slab has also been used for bridge floors.

Circular Structures

Prestressed tanks, silos, pipes, and other circular structures are well accepted in the United States. The watertightness of these structures is of prime concern and is virtually guaranteed by prestressing in two directions—verti-

(Concluded on next page)

John A. Roebling's Sons Co. Photo

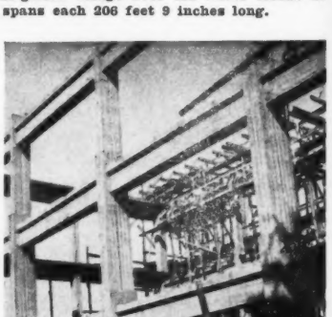
Twenty-foot prestressed slabs placed side by side and prestressed transversely form the roadway support for this 402-foot Rio Paz suspension bridge in Central America.

Portland Cement Association Photo

Prestressed design also marks this continuous-girder bridge over the River Meuse at Sclayn, Belgium. It has two main spans each 206 feet 9 inches long.

Preload Corp. and Gustave Magnel Photos

Prestressed-concrete main beams for a textile factory in Ghent, Belgium, were cast in steel molds on the ground, then hoisted onto brackets formed monolithically with the columns. The girders and beams support a roof area of 375,000 square feet.

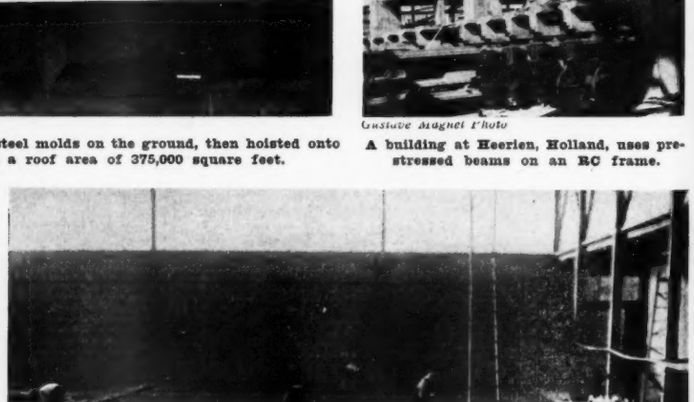


Gustave Magnel Photo

A building at Heerlen, Holland, uses prestressed beams on an RC frame.

Gustave Magnel Photo

Main and secondary beams of this single-story garage at Brussels, Belgium, are prestressed. The garage covers an area of 42,700 square feet.



John A. Roebling's Sons Co. Photo

The 150 x 100-foot elastic-mat floor for a Roebling warehouse in Chicago was prestressed to 600 psi in two directions. In service since 1946, it has remained crackless.

cally and circumferentially. The method used is the Preload system. The circumferential prestressing wire is applied by a winding machine which travels around the outside of the core wall. Moving under its own power, the "merry-go-round" accurately spaces and stresses the wire. This subjects the core wall to a horizontal compression sufficient to overcome tensile stresses induced by the outward pressure of the liquid. The wire is initially stressed to about 140 000 psi; after prestressing, it is bonded to the wall and protected from corrosion by coating with pneumatically applied concrete.

The Preload system is now being used to construct four 205-foot prestressed-concrete tanks at Chester, Pa. These are for the Chester Municipal Authority and will store 38,400,000 gallons of water when completed. This system is also being used to make prestressed-concrete pipe for a 40-mile pressure pipeline in Regina, Canada. The 36-inch-diameter pipe has a 2-inch shell designed to withstand an internal pressure of 280 psi. The use of fully prestressed-concrete pipe for this project saved 14,700 tons of critical steel pipe.

This technique is also applied for prestressing the edge of dome shell roofs for tanks, reservoirs, auditoriums, and industrial buildings.

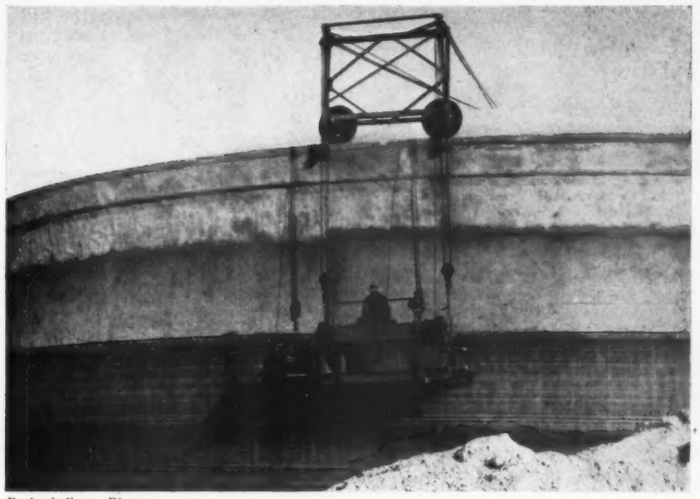
Other Structures

A football stadium 190 feet long, 32 feet wide, and 17 feet high has recently been built at Fayetteville, Tenn., using prestressed members. Designed by Byran & Dozier, Nashville, Tenn., the 31-foot beams were fabricated and placed in the same manner as were the beams for the Madison County bridge. Total cost for the 1,525-seat-capacity stadium was $11,500—approximately $7.65 per seat. This figure represents a considerable saving over a comparable reinforced-concrete design and compares favorably with other types.

Prestressed-concrete masts, 35 feet high, were used in South Africa to carry overhead conductor wires for an electric railroad system. The interest in these masts lies in the forming method. They are U-shaped, the cross section being contained within a square of 22 inches at the base, decreasing through the height of the mast. The thinness of the U-shaped walls made concrete placing and compacting difficult. The solution was to use a wedge-shaped metal puncher having the same dimensions as the cavity. The puncher was brought down on the concrete in the form with a force of 250 tons. The displaced concrete was thereby forced upward to form the upper parts of the arms on the U. Besides obtaining a compact concrete of uniform quality, setting and hardening were accelerated.

John A. Roebling's Sons Co. Photo

Standard precast-concrete blocks, prestressed by Roebling bridge strands, were used for a stadium in Fayetteville, Tenn.



Preload Corp. Photo

Prestressed circular structures are well accepted in U. S. Here a Preload machine, traveling under its own power, spaces and stresses wire on such a structure.

Many prestressed-concrete structures were built in Germany during World War II. Prestressed parabolic hog-backed beams were used for thick concrete roofs of submarine pens. Variations of the same design were prestressed bow-string girders, some with an over-all length of 96 feet. Light roof trusses and prestressed-concrete floats and barges were also designed and constructed.

These are but a few examples of what can be done by adapting the technique of prestressing to specific needs. It has been used for hollow precast columns, railroad ties, hollow and solid concrete piles, and now is being tried experimentally for highway slabs.

Conclusion

The future of prestressed concrete in the United States is entirely dependent upon the willingness and the ability of American engineers and contractors to adapt it to our methods and our economy. It is a revolutionary material, having properties unequaled by others—strength, resiliency, watertightness, economy. Accepted as a challenge to American ingenuity, it offers promise of still greater achievement in the fields of engineering and construction.

New ARBA Division Formed; 1952 Meeting Is Scheduled

At a meeting in May, the Executive Committee of the American Road Builders' Association organized a new division and selected convention headquarters for the 1952 ARBA Annual Meeting.

The new Materials and Supplies Division is headed by a 5-man committee appointed by Paul B. Reinhold, President of ARBA. The committee includes Bernard E. Gray, President of the Asphalt Institute; George H. Kimber, Manager of the Calcium Chloride Association; George E. Martin, Consulting Engineer of the Barrett Division of Allied Chemical & Dye Corp.; J. E. McCracken, Sales Engineer of Bethlehem Steel Co.; and John B. Rhodes, Vice President of American Gas Accumulator Co.

The 1952 Annual Meeting of ARBA will be held in the Rice Hotel, Houston, Texas, January 21-24, 1952. The executive committee also accepted an offer from the United States Travel Agency to sponsor tours to Mexico immediately following the meeting.

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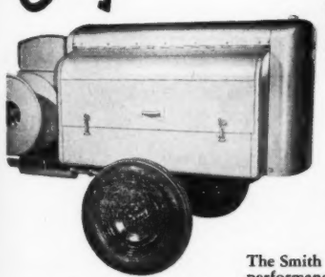

Model 105-P. Has self-starter, battery ignition, voltage regulator, large radiator capacity with thermostat for quick warmup.

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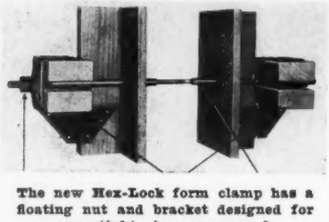

The new Hex-Lock form clamp has a floating nut and bracket designed for easy tightening or removal.

A New Form Clamp

The new Hex-Lock form clamp, recently developed by Williams Form Engineering Corp., 1501 Madison Ave., S. E., Grand Rapids 7, Mich., combines the features of a single cast unit with ease in operation. The new device joins, in a single unit, an adjustable Hex-Lock floating nut and bracket. The metal-to-metal contact of the nut and bracket reduces friction considerably, the company says, and permits ease of operation in tightening and loosening the clamps. The floating nut is locked in place; with a few rotations of the removal wrench, the entire device can be removed as one unit—forms and concrete undamaged. Designed for straight wall construction, the Hex-Lock clamp is made in sizes to meet all needs.

Further information may be secured from the company by requesting Bulletin No. 1150. Or use the Request Card at page 16. Circle No. 453.

Low-Pressure Boilers

Two new low-pressure boilers in the 1½-hp-capacity range have been developed by Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass. The addition of these two new models completes its line, making available 1½-hp Speedylectric boilers with maximum pressures of 15 to 50 psi.

Designed for 220, 440, or 550-volts single-phase power, the new boilers require 15-kw power input for maximum steam output. The manufacturer reports that there are no coils to burn out, no tubes to scale, no open flame or fire hazard, and no low-water danger. Heat is generated by the resistance of the boiler water to the flow of current between solid metal electrodes. Both models are Underwriters' Laboratories listed.

Pressures are adjustable within the capacity range of the boiler. There are no pressure switches, thermostats or relays. These new Speedylectric boilers can be used on closed or open systems. Where continuous boiler operation is required, accessory water feeders are available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 429.

Moderate-Sized Scraper

Four hydraulic scrapers in sizes from 1¼ to 6 cubic yards are described in a bulletin prepared by Henry Mfg. Co., Inc., 1105 Fourth St., Topeka, Kans. Whether powered by wheel-type or crawler tractors, each unit has centralized controls at the driver's seat. Photographs illustrate digging, hauling, and dumping operations. The scrapers feature electrically welded construction, positive penetration of the cutting blade, rear-dump action, and a self-cleaning bowl. Complete specifications on each of the four models are given in the bulletin.

The company also makes a bank-shaving device for use with these units. This attachment enables the operator to cut a ditch to any depth and leave straight banks.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 420.

Data on Diesel Power Unit

A leaflet describing a rebuilt 200-hp industrial diesel power unit is available from BFM Industries, Inc., 2124 Mill Ave., Brooklyn 34, N. Y. The unit described consists of a redesigned, rebuilt, and guaranteed GM 6-71 diesel engine, with new radiator and base, which the company is currently fabricating. It points out that this unit is built as a regular diesel engine, with standard take-off or with extended shaft. The literature gives complete specifications, lists of standard and optional equipment, illustrates the engine, and offers accessory selections.

This literature may be obtained from the company, or by using the Request Card that is bound in at Page 16. Circle No. 439.

Executive V.P. of AISC Dies

Robert T. Brooks, retired Executive Vice President of the American Institute of Steel Construction, died July 2 in Minneapolis. He had held that position from 1935 until his retirement in 1946. In all, he had been connected with the steel-fabricating and construction industry for more than 40 years.

Recording Barograph

A new recording Micro barograph has been developed by the American Paulin System, 1847 S. Flower St., Los Angeles 15, Calif. Designed to a critical accuracy, the instrument is constructed on the Nul or Zero-Gaging principle. All power in the actuating and recording mechanism is supplied by two heavy-duty sealed instrument clocks; no power is taken from the pressure-sensitive device.

The instrument records a pressure curve over a range of plus or minus 1.00 inch of mercury. By means of a convenient reset, it can be used at any elevation from sea level to 10,000 feet. The 24-hour chart is graduated in intervals of 0.005 inch of mercury and can be read to 0.001 inch. The chart time is divided into 10-minute intervals and is readable to one minute. The curve is drawn on specially surfaced paper by a metallic point; no ink is used.

This new recording Micro barograph has been developed by American Paulin System. The unit weighs 30 pounds.

Precision graphs are supplied with each instrument for the purpose of converting readings to elevations (nearest foot) where the instrument is used as a base recorder for altimeter surveys. Contained in a case complete with recording thermometer and charts, the unit weighs about 30 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 458.

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Times Square Tower Gets A Face Lifting

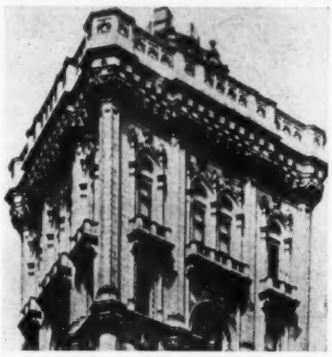
To the crowds who pass the "crossroads of the world" at Broadway and 42nd Street, New York City, the modernization of the historic Times Tower looks like an ordinary job. Actually, it solves a rather complex, though not uncommon, architectural and engineering problem.

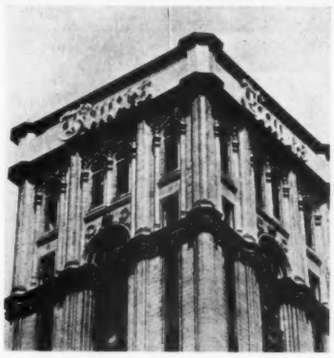
The old cornice on the building projected as much as 8 feet over the Times Square sidewalk, 26 floors below. The elaborately shaped terra-cotta blocks forming the cornice had been securely anchored with steel bars and pipe sections back in 1905, when the building was erected. However, wind, water, frost, and ice had caused serious deterioration. In 1936, one overhanging band of terra-cotta blocks had to be removed and the gap patched.

Recently, inspection revealed that the entire structure had become dangerous because weathering had opened up mortar joints, leaving the supporting anchors exposed to corrosive attack. The hazard to sidewalk traffic below made its immediate removal imperative for reasons of public safety.

Even taking down the old cornice involved hazards. No detail plan could be found to show exactly how the anchorages were arranged. Working closely with the New York City Building Department, Rheinstein Construction Co. erected a scaffold and removed the terra-cotta, piece by piece. This job required the utmost caution, because some of the blocks—with uncertain bond and anchorage—weighed as much as 500 pounds. While the work progressed, consulting engineer Fred N. Severud, of Severud-Elstad-Krueger, advised on technical details and prepared sketches of the existing structure.

The next problem was the design of the new top. Arthur Hays Sulzberger, publisher of the *New York Times*, was explicit in his instructions that the generally Gothic feeling of the building should not be tampered with, since the newspaper regards this former headquarters as something of a monument. Along with requirements of tradition and esthetic good judgment, Architect E. J. Kahn of Kahn & Jacobs, New York, had to cope with the perennial basic considerations: safety, long life, resistance to weather, low maintenance cost, and easy cleaning. Also, there was the possibility of using illumination or some sort of display to gain a bonus in advertising value from the alteration.





This terra cotta cornice dominated historic Times Tower in New York for 46 years. The elaborate masonry work shown here (left) had to be removed piece by piece when it started to deteriorate from weathering. In its place was erected a new sheet-metal parapet with stainless steel skin, shown on the right.

The solution was worked out by retouching photographs. A number of photographic blow-ups of the tower, viewed from different angles, served as the starting point for renderings. Many ideas were suggested, dubbed in on photographs, then discarded.

Out of this series of studies evolved a sheet-metal parapet extending down over the denuded portion of the tower. A supporting framework of hot-dipped galvanized steel angles and channels provided the necessary tie-in with existing structural beams. Stainless steel was chosen for the exterior skin of the parapet to minimize discoloration, weathering, and corrosion. The skin-and-metal-framework type of construction was coupled with plans for a 31-foot sign on each face of the new cornice and parapet. The word "Times" appears in stainless steel letters lighted with white neon.

From the street, the new cornice looks like a plain panel with mouldings at top and bottom that harmonize with the motif of the building. The entire structure is weatherproof, extremely light in weight as contrasted with the masonry it replaced, and it now forms an integral part of the building.

Architects acknowledge the serious problem posed by deteriorating masonry on high buildings. As our early skyscrapers continue to age, it will be necessary, according to present indications, to exercise great vigilance in preventing hazards. Otherwise the problem is sure to become a public one. As the Times Tower project demonstrates, new materials like sheet stainless steel, new shapes within the style or pattern of the existing building, and the opportunity to add a touch of glamor, all tend to remove this sort of job from that of ordinary structural repair.

For Coating Plywood Forms

The use of Formfilm for architectural and functional concrete forms is described in a 4-page folder prepared by A. C. Horn Co., Inc., Long Island City 1, N. Y. Proper coating of forms with Formfilm produces a smooth concrete free from grain markings and ready for painting, the literature says. One application of Formfilm to the plywood forms will suffice for several re-uses, the company reports.

By repelling water, Formfilm protects plywood from warping. The folder says that surface evaporation is no problem and the treated forms require little handling and cleaning before re-use. Job photos show Formfilm being applied by dipping and brushing.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 423.

E. E. Barber (right), shown with E. E. Barber, Jr., and M. C. Brown, is head of the E. E. Barber Construction Co., Fort Smith, Ark. The company uses its Martin Trailer to haul everything from D7's to a 54,000-lb. crane.

SAVE... TIME IN LOADING-UNLOADING

ELIMINATE... DETOURS AROUND LOW CLEARANCES

HAUL... MORE PAYLOAD

WITH MARTIN "FOLDING GOOSENECK" TRAILER!

■ E. E. Barber, Fort Smith, Arkansas, says, "The Martin 'Folding Gooseneck' Trailer is superior to any trailer I've used or seen. It saves time in loading, its low height provides ample clearance, its weight allows more net load."

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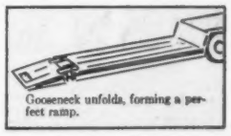

Gooseneck unfolds, forming a perfect ramp.

Truck winch lifts gooseneck and equipment into hauling position.

The "Folding Gooseneck" does away with the dangers and time of building loading and unloading ramps and blocking . . . low platform height carries equipment of every type under low bridges, wires and underpasses . . . rugged, all-welded, frame construction cuts dead weight and allows big loads to be carried within legal limits.

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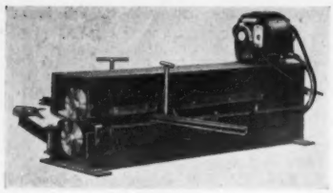

Wilder Mfg. Co., of Monterey, Calif., makes this metal-slitting machine for use in the field or shop.

Sheet-Steel Cutter

Two portable metal-slitting machines for use in field or shop are made by Wilder Mfg. Co., Carmel Valley Route, Monterey, Calif. Models 2024 and 1624 will handle mild steel up to 16 and 20-gage respectively. When ripping lighter gages such as aluminum, they can cut two or more sheets at a time. A 27-inch throat depth makes it possible to cut to the center of a 4-foot sheet of any length. The high-grade-steel cutting blades are said to hold up indefinitely without sharpening. A portable corrugated-sheet slitter is also manufactured by Wilder.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 401.

New Rubber Flooring

A new synthetic rubber flooring has been placed on the market by Flash-Stone Co., Inc., 30 E. Rittenhouse St., Philadelphia 44, Pa. It is said to be resistant to acids, alkalis, water, and other destructive agents. Known as Vulcrete, it dries to a light concrete color. It bonds to wood, metal, concrete, brick, asphalt mastic, composition, or similar bases.

Vulcrete is recommended by Flash-Stone for patching, leveling, and resurfacing worn, broken, or splintered floors; for making durable table and workbench tops; and for general patching, waterproofing, pointing, and other purposes.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 464.

Concrete Industry Board

The Concrete Industry Board, an organization supported by associations and firms interested in reinforced concrete construction, has been established in New York City. The Board will try to improve the quality of concrete construction through education and the pressure of industry opinion.

Roger H. Corbetta, former President of The Cement League, has been elected the first Chairman of the Board of Directors. Eight other directors will be chosen from groups affiliated with the Board: the American Concrete Institute; the American Institute of Architects (New York Chapter); Concrete Reinforcing Steel Institute; Structural Engineers Society; portland cement manufacturers; testing laboratories; and ready-mix concrete producers.

John F. Hall of the Portland Cement Association is Secretary, and Dugald J. Cameron of the Fireproof Products Co. is Treasurer.

Convention Calendar

August 27-31—Shade Tree Convention

National Shade Tree Conference Convention, Netherland Plaza Hotel, Cincinnati, Ohio. L. C. Chadwick, Secretary-Treasurer, Department of Horticulture, Ohio State University, Columbus, Ohio.

October 8-12—National Safety Council

Thirty-ninth National Safety Congress and Exposition, Hotels Stevens, Palmer House, Congress, Morrison and La Salle, Chicago, Ill. R. L. Forney, General Secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

October 8-14—Pan American Road Congress

Fifth Pan American Highway Congress, Lima, Peru. International Road Federation, 550 Washington Bldg., Washington 5, D. C.

October 22-25—ASCE Meeting

Fall Meeting, American Society of Civil Engineers, Hotel Statler, New York, N. Y. Don P. Reynolds, Assistant to the Secretary, 33 W. 39th St., New York 18, N. Y.

January 21-24, 1952—ARBA Meeting

Annual Meeting, American Road Builders' Association, Rice Hotel, Houston, Texas. Lt. Gen. Eugene Reybold, Executive Vice President, International Bldg., Washington 4, D. C.

Tractor-Scraper Teams

Highlights on Caterpillar high-speed earth-movers, the DW20 tractor with wagon and scraper and the DW21 tractor and scraper, are presented in a 24-page booklet available from the Caterpillar Tractor Co., Peoria 8, Ill.

The literature cites the merits of matched scraper teams. Both scrapers have a capacity of 20 cubic yards heaped and 15 struck measure. Diagrams and photos are used to illustrate the construction of the scrapers. Brief specifications for tractor, scraper, wagon, cable control, and bulldozer are included.

This literature may be obtained from the company by requesting Form 30160, or by using the Request Card at page 16. Circle No. 477.

White Acquires Sterling

The White Motor Co., Milwaukee, Wis., has acquired the business and assets of Sterling Motor Truck Co., Inc. of Milwaukee. White has assumed all obligations of Sterling under the purchase contracts or orders heretofore made or placed with Sterling.

This is the first of five TD-24 hydraulic dozers built by Pullman-Standard Car Mfg. Co. since it acquired the Isaacson Iron Works road-equipment division. The tractor was shipped from International Harvester's Melrose Park, Ill., plant to Hammond, Ind., where Pullman-Standard attached its road equipment. Now it is ready to be shipped as a complete unit to the customer.

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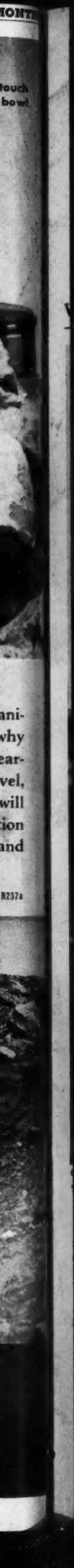
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